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No. 9

## DELAY IN WARSHIP CONSTRUCTION.

President Roosevelt has been investigating the delay in the construction of warships at the various ship yards. He has held a number of interviews with the secretary of the navy on the subject and this week authorized the publication of the following statement:

"The matter of the delay in the completion of vessels of the navy now under construction has been the subject of an interesting correspondence between the president and secretary of the navy. Much comment has been caused by the fact that so many vessels have run over contract time, and by many months. Under date of Feb. 14 the president called the matter to the attention of the secretary of the navy. The secretary's reply with the accompanying statement by Admiral Bowles, chief constructor, covers the subject exhaustively and shows that while through a number of causes the building of war vessels has been delayed and the dates of their completion have been and will be considerably beyond the dates originally set, naval construction in the United States is not materially behind the naval construction of England and Germany in the matter of time."

Admiral Bowles in his report says the delays in construction may, in general, be attributed to one or more of seven causes which, in brief, are as follows:

"First—Inadequate plans, due to the great haste in preparing plans in order to get the ships under contract as soon as possible after congress authorizes them. This is now overcome by the demand of congress that plans shall be completed before it authorizes ships.

Second—Changes in the disposition of armor or armament, or in the details of the designs after the award of the contract—simply a corollary of the first cause.

"Third—Delays in delivery of armor and ordnance, due to the development of improved but tedious processes, long controversies over prices and the limited capacity of armor plants.

"Fourth—Delays due to governmental inspection, it being claimed that the inspection given to United States war vessels and their material is more complete than that given by any other nation.

"Fifth—Delays due to slowness of delivery of steel and other structural materials by subcontractors, which is attributed to the phenomenal demand since 1898 throughout the world for ordinary commercial grades of structural material, which taxes the capacity of manufacturers, who are therefore reluctant to furnish the very high grade products demanded for naval work, the higher quality being not only difficult to make, but less profitable.

"Sixth—Delays due to inadequate facilities or insufficient ability in the contractors' technical staff, the blame in this case being laid on a construction of the law compelling an award to the lowest responsible bidder, and to the policy of so awarding contracts as to encourage small plants to enlarge their facilities; also, in part, to the unsatisfied demand throughout the country for skilled technical assistants.

"Seventh—Delays due to an inadequate supply of skilled workmen, resulting from the withdrawal from the merchant service for the auxiliary navy and for army transports in 1898 of a large part of the registered American tonnage, the replacing of which created a ship building boom, only now falling off 'owing to the failure of the subsidy bill.' "

## OIL FUEL TESTS ON BOARD SHIP.

In many yards, both in this country and abroad, where steamships are built or repaired, announcement of widespread preparations are being made to install oil-burning apparatus. The latest step in this direction was the recent cable announcement that some vessels of the British navy have started on a cruise burning nothing but oil, including battleships and cruisers.

All around New York are to be found ships with the new equipment. One of the vessels which is being transformed is the British Queen, which was so much damaged in the second Hoboken fire that she has been under the hands of the carpenters ever since. Another is the Washtenaw, a tramp of 2,003 tons. A small fleet of coastwise traders has been turned into an oil-burning merchant squadron already, and the Standard Oil Co. is also conducting elaborate experiments.

The Red Star liner Kensington was the first great steamship to cross the Atlantic with oil fuel, making the trip between here and Antwerp last fall. Beyond saying that the preliminary test was successful, the officers of the International Navigation Co. made public no details of the experiment, stating that they would do so after some more voyages had been made. The Kensington went out of commission temporarily about that time, and so the additional trips are yet to come. The oil was used in the forward

burner, a "single ender," and the flames were applied to the tubes through jets placed at intervals under the boilers. Chief Engineer Perrie was in charge and reported that all the defects evidenced in a previous unsuccessful test had been overcome. The officers of the company, after an investigation, admit that the experiment tended to show that oil was destined to occupy a prominent place as fuel. It is learned that careful comparative tables to show the difference in results obtained from coal and oil were made out each day of the trip, but the figures are being withheld until they have been substantiated further.

The single-ended boiler of the steamship had four furnaces, and the reason the initial experiment was not more extensive was that the vessel was fitted with the induced system of forced draft, which had not had apparatus for burning oil successfully adapted to it. The Kensington, which is a sister ship of the Southwark and of 8,669 tons displacement, is expected to solve the problem finally on her next few voyages.

Among oil-burning vessels which have left New York recently is the Anstice, which started for Texas after her coal bunkers had been supplanted by oil tanks. The largest tug in the world, the Luckenbach, burns oil, and has been chartered by a Texas company to transport the new fuel up and down the coast, carrying her total capacity of 25,000 barrels each trip. She makes a speed of 14 knots an hour.

A steamship of 3,928 tons displacement, the Strombus, arrived in Boston from Cardiff, burning oil, soon after the Kensington's test trip from Antwerp to New York. The Strombus used about 30 tons of oil a day and it was stated that 40 tons of coal a day would have been required to maintain the speed she made. It is a question of much difference of opinion among steamship men as to whether coal will be replaced altogether by oil as fuel used for transoceanic travel, and even those who argue affirmatively admit that final proofs have not been forthcoming. On the other side, it is argued that the great recent demand for oil-burning vessels has been due almost altogether to the Texas trade, and that vessels engaging in this trade, being enabled to get oil at special rates naturally could better afford to burn it, whereas the general purchaser might not find it as economical as coal.

## FUEL OIL ON PACIFIC STEAMERS.

It is claimed that oil will soon replace coal as fuel on nearly all of the Pacific steamers if tests now being made on the Pacific Mail line prove successful. All of the Oceanic Steamship Co.'s steamers will soon be refitted with oil burners, so successful have been the results with the Alameda and Mariposa. These two steamers are of 3,000 tons burden and run to Honolulu and Tahiti. The Sierra, Sonoma and Ventura are soon to be taken off the Australian run for the purpose of refitting them with oil burners. On the recent record-breaking trip of the Korea from San Francisco to Honolulu, when the record was lowered over six hours, two experts were on board with a view to acquainting themselves with the working of the vessel and to ascertain what is needed to make her into an oil burner. On the steamers where the oil has been tried it has been found to be more economical, and there is hardly any more danger than with the use of bituminous fuel. The Pacific Mail company is now considering the use of oil on the Korea, and it would not be surprising if a change were made upon her return from the orient.

## JOINT HIGH COMMISSION MAY RECONVENE.

It is learned that Senator Fairbanks has addressed Sir Wilfred Laurier respecting a reconvention of the joint high commission in pursuance of the program outlined when the Alaskan boundary treaty was ratified. Sir Wilfred and Senator Fairbanks are respectively the chairmen of the joint commission and when that body adjourned in 1900 it was with the understanding that it could be reconvened only by the mutual agreement of the two chairmen.

The Alaska boundary was the rock upon which the commission split at its last meeting. Now it is the purpose, the boundary matter having been eliminated by arrangement to submit it to a special commission, to take up again and adjust the same propositions that were under consideration when the joint high commission adjourned. One of the propositions in which the state department is most interested is that relative to lake ship building and it is hoped that an arrangement can be made by which the United States navy can profit by the splendid resources of the lake ship builders, the probable basis being a strict limitation upon the period of time that newly constructed naval vessels may remain in the lakes after completion and perhaps a requirement that their guns be placed only after they are in salt water.



## GENERAL REDUCTION IN WAGES.

**British Ship Builders are Demanding it, and the Situation Among Labor Unions is Threatening—Glasgow Shipping Letter.**

Glasgow, Feb. 12, 1903.—The labor trouble in the ship building trade is now in full swing, and is awakening increasing anxiety. This week the Clyde Federated Ship Building Employers have been receiving delegates (including the head officials of the society) of the Boilermakers & Iron Ship Builders, the Blacksmiths, and other organized trades. The Engineering Employers have already interviewed the representatives of the A. S. E. and the Machine-Workers' Union, who after considering in their several district branches have decided to call for a conference of the central authorities of the Employers Federation and the Allied Trade Unions, in accordance with the terms of agreement under which the strike of 1898 was brought to a close. The Federation of Engineering Employers is not the same organization as the Federation of Ship Building Employers, though many firms belong to both federations. And the trouble is more likely to be with the ship yard workers than with the workers in engine shops, who would, however, be involved if the ship yards come to a stop. In the north of England the Ship building employers have plainly intimated that they will close their yards if all the trade unions do not concur in the reduction of wages. The same course will doubtless be adopted by the Scotch ship owners, although they have not yet made any announcement to that effect. They have not had any occasion to do so, because none of the trades has yet positively rejected their terms, however much they may have argued against them. It is, however, feared that in Scotland as in the north of England, the obstacles will be the members of the Carpenters' and Joiners' Society and of the Plumbers' Trade Unions. These organizations have the majority of their members employed in other trades than ship building, and they outvote a reduction in the wages of those of their members who work in the ship yards in case that is made a precedent for a reduction in all the other trades also.

The position taken up by the Scotch ship builders in their conferences with the several trade unions, collectively and separately, is this: They say that the industry has got into a depressed and is getting into a stagnant condition because the cost of ships is now too great to admit of a commercial profit being made by ship owners at the current range of freights. Liners and special craft are ordered as required, irrespective of freight markets, but such orders go only to a very limited number of yards and do not affect the depression in the majority of the yards. That depression can only be removed by a renewal of the demand for ordinary ocean freight-carriers. Such demand can only be revived by a material reduction in the costs of producing new ships. As far as capital can do so such reduction has been made, and material also is lowering in price. But the main item in the cost of producing a ship is labor, and there is no hope of improvement in demand until the cost of labor is reduced. The amount of reduction asked for is only 5 per cent. but the employers say that the reduction must be throughout every branch of labor in the industry. It will not do for one set of men to concur and others to hold off. The employers place all the trades on the same basis, and the inference is that if any one of the trades refuse to comply a halt will be called. This has not been declared, but I fancy the men pretty well understand the position, and that is the reason they ask for a conference between the two federations—that of capital and that of labor. The Federation of Trade Unions is not empowered to make collective wage bargains, but it was hoped by a composite meeting to fix upon a common line of action. As a matter of fact, however, each trade union concerned is considering its own paces. It should be mentioned that while the ship yard workers have had four advances since 1895, and in 1898 reached a scale above anything they had ever had previously, they have not had a single reduction since the trade began to decline. The wages now current have been unchanged for four years, although the percentage of unemployed men is very much greater. There are now about 20 per cent. fewer men employed in the Clyde ship yards than a year ago.

## CORPORATION GAINING GROUND.

The annual meeting has just been held here of the British Corporation for the Survey and Registry of Shipping, under the presidency of Mr. Francis Henderson of the Anchor line. This corporation has now been twelve years in existence. During 1902 the tonnage of the vessels which were built exclusively to the corporation's class and rules showed an advance of about 25 per cent. over those completed in 1901, and reached a total of over 135,600 tons. The number of vessels building at present to the British Corporation class is well maintained, and includes three 10,000-ton steamers for the P. & O. Co., two large vessels each for the City, Hall, Wilson, Clan, and Anchor lines, as well as vessels for P. Henderson & Co.'s Rangoon line, the Union Steamship Co. of New Zealand, Bowring & Co., the Clyde Shipping Co., Hogarth & Co., and several other important firms. While the work of the past year was as remarkable for its variety as in previous years of their history, including as it did towing steamers, tramp vessels of all sizes, turret steamers, and passenger vessels, ranging from the twin-screw Princess Vic-

toria, of 1600 tons, for the Canadian Pacific railway, to the twin-screw Columbia of 8,300 tons, for the Glasgow and New York trade; perhaps the most distinctive feature of the year had been, the president said, the number of single-deck vessels with the machinery placed at the after end, which by reason of the absence of beams and other obstructions in their holds, the large number and size of the hatchways, and the innumerable facilities for handling cargo rapidly, can load and discharge large cargoes in a manner never previously attained. These vessels might be regarded as an evidence of willingness to learn from others, and to adapt to our own purposes here the methods in regard to the rapid handling of cargo, which our American friends have found so successful in their vessels employed on the great lakes and elsewhere. Some of the vessels mentioned were, as a matter of fact, for American account, but the most remarkable case was that of the steamship Mercedes, of 4,300 tons, belonging to Christie & Co. of Cardiff, which in addition to these exceptional facilities for working cargo possessed the great advantage of being a self-trimmer, and had also the top corners of her structure as well as the double bottom adapted for water ballast, thus enabling her when necessary to proceed from one port to another without cargo with greater safety than would otherwise be possible.

Some interesting remarks on the subject of riveting have been made by Mr. A. Denny, the ship builder. He is chairman of the technical committee of the British Corporation, whose staff are now engaged in preparing for a revision and extension of the rules. The modern vessel, he said, was not only increasing in size, but the ratios of length, breadth and depth were changing. In regard to the increase in actual size, this meant not only increased scantlings, but increased size of rivets and increased care in laying up these larger rivets. It was a question whether the limit of size of rivet which could be driven by hand had not been reached. Machine riveting on the shell of steamers was understood to have been successfully accomplished in America, and while the shell had not been attacked here, some progress had been made in internal work, and there was no reason why this should not be extended to the shell, with the assistance of the men. The machine riveting would also allow of a greater use of steel rivets, which Mr. Denny thought would be very advantageous in large ships. The committee in the revision of the rules would taken care to embody the result not only of the experience gained in vessels classed with them, but, having many ship builders on the committee, they had information of other vessels also at their disposal, and they would take care that while avoiding anything in the nature of panic legislation, ample provision would be made for the increased strength necessary for the larger vessels.

## COMPETITION FROM FRENCH BOUNTIES.

The president of the Clyde Sailing Ship Owners' Association at a meeting of the society this week, discussing crimping in Portland, Ore., said he found that this practice was as bad as ever, but they were trying to get the other associations to join them in making a test case. Their friends on the other side advised them that this was the only way to put a stop to it.

President Clink also dwelt at length on the competition of French sailing ships supported as they are by bounties. These French bounties are, no doubt, a prominent cause in the depression of shipping. According to Lloyd's Index for Jan. 22 there were twenty-three French ships at or bound for North Pacific ports, while no fewer than thirty were on their way from there to the United Kingdom or continent, and eleven were bound from the same ports to the Cape of Australia. The French law on the subject of bounties was altered April last, when the government confirmed the construction bounty to builders of all iron and steel ships and of all wooden vessels. The rate of this bounty is 65 francs per ton for iron or steel ships, 40 francs per ton for wooden ships of 150 tons and over, 30 francs per ton for wooden ships under 150 tons, 150 francs per 1,000 kilogs. for engines, boilers, etc. Notwithstanding this French-built vessels are about 35 per cent. dearer than British-built vessels. Owing to the large bounties for navigation paid to the owners they seem to be able to afford these prices. Under the new law a sailing vessel gets 1 franc 50 centimes per gross ton per 1,000 miles for the first year, with an annual reduction of 2 centimes for the first four years, 4 centimes for the second four years, and 8 centimes for the third four years. Up to 600 tons the bounty is paid in full; for every 100 tons (or part of 100) over 600 tons the rate of initial bounty is reduced 10 centimes, and the bounty given to a vessel over 1,000 tons is the same as that to which a vessel of 1,000 tons was entitled. A vessel of 1,000 tons or above would receive 1 franc 30 centimes instead of 1 franc 70 centimes per ton per 1,000 miles the first year. The payments continued for twelve years. While the new law reduced the bounties to sailing ships it increased them to steamers. French-built steamers have the right for each voyage to choose between the outfit bounty and the navigation bounty. The outfit bounty (compensation d'armement) is payable for every day the roll of the crew is complete, but it is limited to a maximum of 300 days in the year. The amount payable varies from 5 centimes per ton per day to 2 centimes per ton per day according to the size of the steamer. This bounty also applies to foreign-built steamers above 100 tons gross sailing under the French flag,



engaged in the ocean and international coasting trade. The navigation bounty (prize de navigation) is paid per gross ton per 1,000 miles as follows: For steamers of 1,000 to 3,000 tons, 1 franc 70 centimes. The allowance diminished as the vessel increased in size. This is for the first year, after which the rate diminishes annually 4 centimes for the first period of four years; 8 centimes for the second period of four years and 16 centimes for the third period of four years. But under this new law not a single French steamer was ordered until Oct. 9 last. Various orders then came forward and Dec. 17 all the available bounty had been taken up. Under the present law French owners paid large prices in the hope of earning the bounty for twelve years, but the ship might be lost on her first voyage, and owners could not sell their vessels to advantage except to French subjects as the bounty is only paid to ships owned and manned by Frenchmen. There were 59,000 tons of steamships under construction in France at the end of 1901, and 77,000 tons at the end of 1902.

Referring to these facts, President Clink said that this state of matters revealed a kind of competition which was difficult to meet. It was suggested by some that their ships should be subsidized by government, and by others that every foreign subsidized ship touching at ports in the United Kingdom, colonies, or dependencies should be made to pay a countervailing tax, but, in his opinion, the only practical remedy was to lighten the burdens imposed on British shipping by parliament, and relieve ship owners from many irritating and useless legal provisions. He was glad to notice that the select committee on steamship subsidies recommended the remission of all light dues. He hoped that parliament would not be long in giving effect to this. He thought the law ought to be altered so as to protect British owners. He also hoped that all foreign vessels trading or going from or between any place or places in the United Kingdom or any British possession would be subjected to all the provisions of the merchant shipping act as were British vessels.

Mr. William Law of the Glasgow "Shire" line of sailing packets, said that the decrease in the tonnage, which was a marked feature in the returns of sailing ships of recent years, had almost ceased. For example, in 1901 there was a decrease in the registered sailing tonnage of the world of 126,000 tons, whereas last year the decrease only amounted to 1,000 tons. These figures showed that while the British ship owners are still getting quit of their sailing ships—the decrease in the United Kingdom last year being 65,000 tons—foreigners are buying and building to an extent that was keeping the tonnage stationary. The sailing tonnage built in the United Kingdom last year was 49,352 tons, being more than double that of the preceding year, while in France the sailing tonnage built totalled 141,329 tons, including fifty-four vessels of 2,000 tons and upwards. It is worthy of note that there are now only 8,214 tons of sailing tonnage building in France, which shows that the bounty is now reduced to a point offering little or no inducement to French ship owners to build for it. While British ship owners generally still evidently believed that ships of 2,000 to 3,000 tons register were large enough for all purposes, foreigners, or some of them at least, had faith in size, and during 1902 the largest sailing ship ever built was put into the water from one of the American yards, a steel schooner-rigged, seven-master of 5,218 tons register. This was closely followed by a German ship of 5,081 tons register.

The new steamer *Bharata*, built by Scott & Co., Greenock, for the British India Co., has sailed for the east after having satisfactorily completed a series of official trials under extremely adverse weather conditions. The speed obtained on deep-load trial was 15 knots, and a thorough test of the vessel's sea-going qualities was made, which proved satisfactory to owners and builders alike, the smoothness of working of the machinery and the entire absence of vibration being specially commented on. The *Bharata*, with other recent Clyde vessels, is to develop the passenger and mail traffic between Calcutta and Rangoon.

#### CALLING FOR REMOVAL OF LIGHT DUES.

On the burning question of lighthouses and light dues, the secretary of the North of England Protective Association, which represents over 2,000,000 tons of shipping and £25,000,000 of capital, has addressed the following letter to the president of the board of trade: "I am requested by my directors to inform you that at the annual meeting of this association, which was held at Newcastle on the 27th ult., the resolution of the special committee of 1845 on lighthouses and the recommendation of the select committee of 1860 were fully discussed. The memorandum issued by the Trinity House, under date of July 15, 1902, and the recent recommendations of the Shipping Subsidies Committee on this subject, were also carefully considered, and it was pointed out that as previous to the repeal of the navigation laws ship owners were 'subjected to various burdens which would never have been imposed upon them had they not been a protective class,' these burdens should have been removed when British ship owners ceased to be protected. Instead of this fresh liabilities and restrictions have been enforced, some of which are dealt with in the enclosed section of our 'suggestions,' and, pending the adoption of other measures, by which British shipping may be able to compete for the carrying trade of the world on something like equal terms, it was unanimously resolved:

"That, in consideration of the encouragement given by other countries to their shipping industries, no further time should be lost in commencing to free British ship owners from the disabilities under which they labor, and that effect should at once be given to the recommendations made by the select committees of the house some fifty or sixty years ago, viz.: 'That the lighting of our shores is a high imperial duty which we owe not merely to ourselves, but to strangers whom we invite to trade with us. That all expenses for the erection and maintenance of lighthouses, floating lights, buoys and beacons on the coast of the United Kingdom be henceforth defrayed out of the public revenue.'

"My directors also submit that the superintendence and management of lights, buoys and beacons on the coasts of Great Britain and Ireland should be transferred to the board of trade, with the assistance of committees representative of the shipping, navigation, and trade of the country."

We are a good deal interested here in the efforts and proposals to solve the problem of the port of London. On this subject I draw attention to the following declaration by Mr. C. J. Cater Scott, chairman of the London & India Docks Co.: There can be no objection to the principle, he says, to a single public authority being established for managing the river, including the duties of the Waterman's Company, but the docks should be excluded from management by the port authority leaving them to be carried on as commercial undertakings with a fair and wholesome competition with the riverside accommodation. The dock companies ought to be provided with amended revenue powers on goods discharged in the docks sufficient to insure the raising of capital for new works and equipment that may be necessary from time to time for the accommodation of the trade. In return the companies would agree (1) to a limitation of dividend, (2) to a reduction in the maximum dues on shipping from 1s. 6d. to 1s. (as against a maximum of 1s. 6d. recommended by the royal commission), (3) to be placed under the jurisdiction of the railway commissioners as to the reasonableness of their non-statutory charges, (4) the companies would also be willing to be made liable to be called upon by the port authority (subject to appeal to the board of trade) to execute such works of improvement in the docks as may be thought by that authority to be necessary. Such a scheme, whilst in many respects carrying out the recommendations of the royal commission, would remove the difficulty as to competition with private interests which evidently pressed upon the royal commission. It would constitute one supreme authority for the port, with the existing dock companies practically as managers of the docks, thus, in effect, adopting the suggestion of the royal commission as to the formation of a statutory dock committee to manage the docks. There would be no need for any large financial scheme in connection with the purchase of the dock companies' undertakings, nor any necessity to have recourse to local or imperial taxation. Moreover, the financial position of the companies would be so far stereotyped as to render their purchase by the port authority a comparatively simple matter, should circumstances hereafter render that course practicable and desirable.

#### PRODUCTION OF PIG IRON IN CANADA.

The American Iron & Steel Association has received, direct from the manufacturers, statistics of the production of pig iron in Canada in 1902. They show an increase of 74,581 gross tons, or over 30 per cent. as compared with 1901. The total production in 1902 amounted to 319,557 gross tons, against 244,976 tons in 1901 and 86,090 tons in 1900. In the first half of 1902 the production was 157,804 tons and in the second half it was 161,753 tons, a gain of only 3,949 tons. Of the total production in 1902, 302,712 tons were made with coke and 16,845 tons with charcoal. A little over one-third of the total production was basic pig iron, namely, 107,315 tons. The Bessemer iron made amounted to about 9,000 tons. Spiegeleisen and ferromanganese have not been made since 1899. The following table gives the total production of all kinds of pig iron (including spiegeleisen and ferromanganese) in Canada from 1894 to 1902. Prior to 1894 the statistics of pig iron production in Canada were not collected by the American Iron & Steel Association.

Years.	Gross tons	Years.	Gross tons.	Years.	Gross tons.
1894..	44,791	1897..	53,796	1900..	86,090
1895..	37,829	1898..	68,755	1901..	244,976
1896..	60,030	1899..	94,077	1902..	319,557

On Dec. 31, 1902, the unsold stocks of pig iron in Canada amounted to about 20,000 gross tons, as compared with 59,472 tons at the close of 1901 and 12,465 tons at the close of 1900. Of the unsold pig iron on hand on Dec. 31 over 19,000 tons were coke pig iron. On Dec. 31, 1902, Canada had fourteen completed blast furnaces, of which seven were in blast and seven were idle. Of this total nine were equipped to use coke for fuel, four to use charcoal and one to use mixed charcoal and coke. In addition four coke and two charcoal furnaces were being built or were partly erected on Dec. 31, but work on several of the furnaces was temporarily suspended.



### NAVAL COALING STATIONS.

The growth of the navy can be followed in the growth of the coal bill. In the year ending June 30, 1892 the United States paid \$550,451 to supply the naval vessels with coal. Last year the bill for coal on board ship was \$2,220,201 and in addition \$750,000 was spent on coaling stations. About three-fourths of the coal consumed by warships is from domestic sources; the balance is foreign coal. Some interesting facts are observed with regard to the naval coal supply. It is found, for example, that it is cheaper to buy Cardiff coal, duty paid, in San Francisco than to ship our own coal from Atlantic ports around Cape Horn to supply our vessels on the Pacific station. The bureau of equipment in the navy department has made agreements in sixty-one foreign ports all over the world to supply our naval ships with coal at less than current rates. These arrangements were begun three years ago and are found to be both convenient and economical. All the large navies of the world have adopted this method of increasing their facilities for coaling warships.

We have fourteen coaling stations on the Atlantic and Gulf coasts from Frenchman Bay, Me., to New Orleans. The only coaling station on the south Atlantic coast is at Port Royal, S. C. The construction of the coal depot at the Brooklyn navy yard has made slow progress, but is now nearly completed. A pier runs out from the Cob dock into the East river upon which a coal pocket with a capacity of 9,000 tons will be situated. A vessel of any size may be docked on either side of the pier and receive coal from the pocket by gravity.

Coal will be distributed throughout the navy yard by means of cars which will be run under the pocket and loaded by gravity. It will take some time to build the pocket, but the contract has been let. A large amount of coal will have to be kept on hand; the 9,000 tons which the pocket will hold would go only a short way toward supplying squadrons that may rendezvous in this harbor. Our new battleships and armored cruisers have a capacity of 2,000 tons each, while the older ships of these types can carry on an average 1,500 tons.

We have five coaling stations on our long extent of Pacific coast. They are situated at San Diego, San Francisco, the Puget Sound naval station, Sitka and Dutch harbor on Unalaska, one of the Aleutian islands.

Twenty acres of land has been transferred to the navy department at Dutch harbor for its coal depot. The water is deep, the site is excellent for the purpose, and a wharf and coal depot, with a capacity of about 5,000 tons, are to be built. The fact may not be generally known that the war department is about to fortify both Sitka and Dutch harbor.

The coal storage plant now building at the Puget Sound naval station will have a maximum capacity of 20,000 tons of coal. As no good coal is obtainable on the Pacific coast it is necessary to transport all the coal used by our warships on that station about 15,000 miles by water. Among other insular naval coal stations, San Juan, P. R., is one of the most useful, supplying coal and water to a large number of ships of the navy, particularly during the winter months. San Juan is anything but an ideal coaling station, as it can be used only by ships of small or medium size. Larger ships are prevented from entering the harbor by shoal water at the entrance.

It has been regarded as very unfortunate that we had no other coaling station in the West Indies, and the chief desirability of buying the Danish islands was the fact that St. Thomas offered ideal conditions for a coaling station. Now that Cuba has agreed to let us have coaling stations on the island we will be very well equipped in this respect in the West Indies.

The storage capacity at our depot in Honolulu has been increased to 30,000 tons and it is intended to keep the depot in good condition as it will be several years before the proposed naval station can be established at Pearl harbor. A while ago there was a coal famine at Honolulu and several mail steamers and also sugar plantations were supplied with coal from the naval depot. It was fortunate that this service could be rendered, for otherwise the steamers would have been obliged to lay up and the cane crop would have been ruined for lack of fuel to run the machinery.

Pago-Pago bay in Tutuila islands, Samoa, is now a naval station and an appropriation is being made to extend the capacity of the coal depot, the present steel shed holding only 5,000 tons. The improvements will include better appliances for handling coal and larger storage capacity. The port of Pago-Pago is the most valuable in the south Pacific. It is rapidly increasing in importance and is already a port of call for the regular line of steamers between Australia and San Francisco.

The retention of Guam as an American possession after its capture was for the express purpose of establishing a naval coal depot. As yet the appropriation for the improvement of the port of San Louis d'Apra has not been made because, though passed in the senate, it failed in the house. The improvement will certainly be made before long as with the completion of the Isthmian canal, Guam will become an important commercial port of call.

A large and commodious naval coal depot at Cavite, in Manila bay, is now building and will be fitted with all modern appliances. Seven other sub-depots have been established at various ports of the Philippines, including Cebo and Iloilo.

### SHIP BUILDING AT BATH.

Ship building in the Bath district continues with unabated vigor, all the ship yards having quite as much as they can reasonably attend to. At the Kelley-Spear Co.'s yard the four-masted schooner building for Capt. Gorham of Round Pond is all planked and the work of finishing her up is well along. The masts will be stepped this week. The craft will bear the name of Cohasset and will probably launch the last of this month. The keel is stretched and the stern post up for a four-masted schooner for Capt. Elzey of Bethel, Del. Workmen are molding out the timber and work will be rushed as soon as the Cohasset is launched. This schooner has a 170 ft. keel and will be 37 ft. beam and 13 ft. deep. The stern post is up and keel stretched for a barge for New York parties, which will be hurried along as fast as the timber arrives from Northern Maine and Canada.

At the yard of the New England Ship Building Co. the four-masted schooner building for Capt. S. C. Thompson of Mattawan, N. J., is all framed, sealed, her deck laid and ready for planking. This craft is 181 ft. long, 39 ft. wide and 18 ft. deep. She will slide into the Kennebec some time in April. The barge building for the Baltimore & Boston Barge Co. is half framed. She will be 220 ft. long, 39 ft. wide and 18 ft. deep.

At the ship yard of Arthur Sewall & Co., Bath, Me., the only thing on the stocks is the five-masted steel schooner to be managed by the firm. She is all plated with the exception of two plates and riveters are very busy closing her up. The houses have been constructed and the work of laying a wood deck over the steel one is progressing rapidly. The deck will cover every portion of the craft and will be made of 4 by 4-in. pine. There is considerable work to be done before the steel masts can be stepped. They are lying in the yard all ready for use, as is the big bowsprit.

At G. G. Deering's yard the five-masted schooner being constructed for the firm is all planked and cemented and painters are doing their work. The masts will be all in within a week and then riggers will hustle the craft to completion. She will be commanded by Capt. J. E. Ross of the schooner Edward E. Briry, who has an excellent reputation and is an able master. She will probably take her maiden plunge the first of March.

At Crosby's yard the four-masted schooner building is well under way. She will be a duplicate of the Frank T. Stinson. The Stinson was the first vessel built by Mr. Crosby and was constructed in the keel yard in 1887. Her dimensions are 185.8 ft. length, 38.2 ft. beam, 18.2 ft. deep, 994 tons. She is now in service in the J. S. Winslow fleet of Portland. The last vessel built in the Reed yard was the four-master Cordelia E. Hayes of the Percy & Small fleet, launched in August of 1901.

At Percy & Small's yard, Bath, Me., the four-masted schooner under construction is all framed and half planked. She will probably go overboard some time in March.

At the Bath Iron works the battleship Georgia is three-fourths framed and about forty plates have been put in position on her deck. The oil barge Shenango for the J. M. Guffey Petroleum Co. is to be launched on Mar. 18. She is 305 ft. long, 44 ft. wide and 22 ft. deep. The caisson for the Kittery navy yard is all framed and plated.

### WANTS GUNBOATS RETURNED.

The bureau of navigation has recommended to the assistant secretary of the navy that steps be taken to withdraw from the various state militias the vessels loaned to them by the government. This action grew out of the request of the state of North Carolina for the return of the converted gunboat Hornet which had been turned back to the government by the state because the state could not keep it in repair. The Hornet is now being fitted out as a tender to the receiving ship Franklin.

"The work that these small vessels do," the bureau says, "is of the greatest value to the navy, especially at this time, when the deficiency in properly trained men is great, and the bureau is decidedly of the opinion that it would be very detrimental to the service to withdraw the Hornet from this duty."

It then recommends that the government secure the return of the following vessels now loaned to the respective states named: From Massachusetts, the Inca; Connecticut, Elfrida; New York, Aileen; New Jersey, Huntress; District of Columbia, Oneida; Maryland, Slyvia; Louisiana, Stranger; Ohio, Hawk; Illinois, Dorothea.

At a banquet recently given in his honor at Collinwood, Ont., Sir William Muloch, the postmaster general, speaking of foreign trade said that no country could be great unless identified with commerce beyond its limits; that Canada has no neighbors on this continent with whom she can trade and that therefore she must trade with countries beyond the seas. The foreign trade of Canada last season was \$414,431,881, of which \$166,526,283 is credited to Great Britain and \$192,012,434 to the United States. The merchandise which entered Canada for consumption was \$202,791,595, of which Great Britain supplied \$49,206,062 and the United States \$120,814,750. Sir William Muloch's statements are not supported by facts.



## WIRELESS TELEGRAPHY MAY BE REVOLUTIONIZED.

In its last issue the Electrical Review describes a new apparatus invented by Peter Cooper Hewitt, which some of those who have examined it say will make a revolution in methods of sending wireless telegraph messages. The device consists of a glass globe, about 10 in. in diameter, having two tubes containing mercury sealed into the bottom of the vessel. This apparatus acts as a powerful and effective interrupter, and takes the place of the spark gap now used in discharging the condensers for setting up electrical waves. It enables powerful, rapid and continuous oscillations to be set up in the antenna, or sending mast, used in transmitting wireless messages, and not only enables messages to be sent over very great distances with ease, but permits secrecy to be maintained which heretofore has been impossible.

The operation of this device depends upon two new phenomena in physics, which have been discovered by Mr. Hewitt in the course of his researches. The first is the resistance of the mercury in the apparatus to a passage of current until a high potential has been applied; the second is the disappearance of this resistance after this high voltage has been reached. The effect of these two phenomena is to permit a condenser to be charged to a high potential, and then, by the disappearance of the resistance of the interrupter, to discharge it very rapidly. The result of this action is to set up violent and rapid current impulses in the circuit containing the condenser, and thence in the sending wire. These current impulses, being very powerful, will enable messages to be sent to great distances, and as the number of oscillations per second can be controlled, this permits of selective signalling. The number of impulses per second can be made very high—above 1,000,000 per second if desired. The device is inexpensive, and it is said that there is no appreciable deterioration in it, so that it has a long life.

Dr. Michael I. Pupin, professor of electromechanics at Columbia university, and well known as the inventor of the Pupin system of long-distance and submarine telephony, is much interested in the Cooper Hewitt mercury vapor interrupter and made the following statement of his estimate of the value of the new device:

"I have watched the development of the Cooper Hewitt mercury vapor tube as an interrupter from the very beginning. The present operation of the device comes up to my highest expectations, and in my opinion it is one of the most important discoveries in physics which has been made during the last ten years. The operation of the tube as an interrupter depends upon two new elements in the character of the cathode resistance of the vacuum tube—first, the disappearance of this cathode resistance as soon as the impressed voltage has reached a certain value; second, its sudden reappearance as soon as the current strength through the tube has fallen below a certain small value. These two elements are entirely new, and they form one of the prettiest discoveries which Mr. Hewitt has made in the course of his investigations.

"I do not know of any other case where a physical discovery found such a rapid practical application, and this is due to the fact that physicists experimenting in the domain of electrical waves, and electrical engineers engaged in the development of wireless telegraphy, were waiting for a current interrupter possessing the very characteristics which the Cooper Hewitt tube possesses in consequence of the two novel elements referred to above.

"To illustrate this it is sufficient to refer to the needs of wireless telegraphy which the mercury vapor interrupter seems to satisfy. It is perfectly evident today that wireless telegraphy will not make any essential progress until a method is discovered of generating very powerful and persistent electrical waves. They must be powerful in order to overcome distance, and they must be persistent to enable us to employ the methods of selective tuning. The Cooper Hewitt mercury interrupter is capable of furnishing just such kind of electrical waves, and there is no other interrupter which comes anywhere near it in this respect. I do not think that I am saying too much when I state that the contribution which this development will make to wireless telegraphy is by far the most important which has been made since Marconi's earliest experiments, which demonstrated the practicability of transmitting electrical energy without wires to a distance of over twenty miles by employing two upright wires, each grounded, and impressing on the sending wire electrical oscillations such as Hertz employed in his classical experiments.

"The early experiments by Mr. Marconi were a revelation to physicists, not because they contain any physical novelty, but because they demonstrated that by a certain arrangement of receiving and transmitting conductors the waves generated could be felt at such a long distance. I think it will be admitted on all sides that since the time of Marconi's early experiments, no new knowledge with regard to the method of generation or transmission of the electrical waves has been offered to those who are engaged in the practical development of wireless telegraphy, so that today wireless telegraphy is practically in the same condition in which it was in 1896. The Cooper Hewitt mercury vapor interrupter is the first contribution which possesses extraordinary novelty, and which on account of its peculiar properties is the very thing needed in order to extend wireless telegraphy with a single

stroke away beyond its present limits. How far this extension will reach I am not prepared to say, but that it will be far-reaching there is not the slightest doubt in my mind."

## ANNUAL MEETING STANDARD CHAIN CO.

At the annual meeting in Jersey City last week of the stockholders of the Standard Chain Co., whose main offices are in Pittsburg, President John C. Schmidt read his annual report showing a very satisfactory condition of affairs. The following directors were elected for the ensuing year: John C. Schmidt, Charles H. Hayden, Robert Garland, J. T. Davis, A. S. White, Franz Krein, Eli Attwood, Peter Wertz, Frederic F. Culver, Charles A. Painter, George S. Schmidt, F. W. Prentiss and Oscar L. Gubelmann. Out of a possible 22,946 votes, 20,706 were cast for each director above named. At the subsequent directors' meeting the following officers were elected: John C. Schmidt, president; Robert Garland, vice-president; J. T. Davis, general manager; Franz Krein, assistant general manager; Wm. Robertson, treasurer; W. R. Dawson, general sales agent. Executive committee: John C. Schmidt, chairman; Robert Garland, J. T. Davis, Franz Krein and Peter Wertz.

Following is the condensed balance sheet for Dec. 31, 1902:

ASSETS.	
Real estate, plant, buildings and machinery.....	\$2,461,308.93
New construction .....	176,506.00
Common stock in treasury .....	10,000.00
Accounts and notes receivable .....	\$261,854.17
Materials and supplies, including furniture and interest and insurance paid in advance .....	463,944.28
Cash .....	10,376.04
	<hr/>
Total .....	\$3,383,989.42
LIABILITIES.	
Capital stock: Common .....	\$1,277,200.00
Preferred .....	1,031,400.00
First mortgage bonds: Issued .....	\$700,000.00
Less, redeemed and canceled .....	\$40,000.00
Treasury bonds .....	113,000.00
	<hr/>
	153,000.00
	<hr/>
	547,000.00
Accounts payable .....	\$132,369.92
Bills payable .....	151,000.00
Bond interest accrued (not due).....	12,780.00
	<hr/>
	296,149.92
Total liabilities .....	\$3,151,749.92
First mortgage bonds, premium account.....	6,329.98
Surplus .....	225,909.52
	<hr/>
Total .....	\$3,383,989.42

## NEW YORK NOTES.

Mr. H. B. Roelker, consulting and constructing engineer, 41 Maiden lane, New York, lately completed the installation of an Allen dense air ice machine in twenty-three days' time on the steam yacht Riviera, the owner of which suddenly determined on a five or six-months' cruise to South America, Africa and the Mediterranean. A rush order for an Allen ice machine was therefore given and the time record for installation broken. The yacht left on her cruise a short time ago. Mr. Roelker is also placing similar machines in Mr. Hart's new yacht Constant, now building in Baltimore, and Mr. Chas. S. Bryan's yacht Czarina, building by the United States Ship Building Co. at the Crescent yards, Elizabethport, N. J. He also has under way in his shops fifteen of these machines, the majority of which are to be installed in old and new United States war vessels.

Capt. Howard Patterson, late of the United States navy and now president of the New York Nautical College, and Mr. George Crouse Cook, naval architect of 15 Whitehall street, and lecturer on naval architecture to the New York public schools, have formed a partnership under the firm name of Cook & Patterson, naval architects and engineers, and have opened offices at 130 Water street, New York. They purpose making a specialty of large steam yachts.

Ship building has been revolutionized three times during the past month. The latest to revolutionize it, according to the newspapers, is Prof. Keretzschmer, chief constructor of the German navy, assisted by the kaiser. The ordinary type of vessel is entirely rejected and one substituted for it in the form of an aquatic bird. It is understood that by annihilating wave resistance the propelling capacity of the screw is augmented 50 per cent. It is stated that the new type of vessel will make no motion or waves of any kind but will glide along the surface of the water with the easy motion of a duck.

Sawyer Bros. of Millbridge, Me., have sold the vessel that is now on the stocks at their yard, and which they expect to have completed in July, to Henry Lord of Bangor.



# NEWS OF THE GREAT LAKES



## PRICES OF IRON ORE—LAKE FREIGHTS.

From present indications there will be nothing done regarding the coming season's lake freights for probably a month. This opinion is based mainly on delays encountered by the ore dealers in fixing prices of ore. It is safe to repeat the statement that there will be an advance in prices of ore (how much is not yet determined) and that shippers are believed to be willing to pay somewhat better rates of lake freight than they paid last year, but within the past week conditions have been encountered that prompt further delay and there is no disposition in any branch of the lake industry to hurry matters. The ore dealers found it necessary, principally on account of the contentions of Mesabi interests, to make a most rigid inquiry into the actual properties of the ores, both physical and chemical. The producers of Mesabi ores are desirous that the ores of that range shall be measured by their actual properties and shall obtain the current rate for ores of like quality. Hitherto there has been a sort of embargo upon the ores of this range. This labor of chemists, both with Bessemer and non-Bessemer, as it is expected there will be a "gentlemen's agreement" regarding the latter, will require ten days or more. Furnaces are expecting to pay an advance, realizing that the mining interests have not had the full share of profits which have attended the manufacture of iron and steel during the past few years.

Even after the prices of ore are fixed there will be a disposition among the vessel interests to await, if they can, a settlement of ore handling charges and other expenses connected with the operation of the ships. While it is true that they have not at all times in the past had a full knowledge of these expenses before making freight contracts, they profess a desire to be better informed on this score this year. The ore dock managers will not meet the longshoremen on the subject of wages until about the middle of the coming month. The executive committee of the Lake Carriers' Association will be prepared shortly to meet the representatives of the various unions for the purpose of adjusting wage schedules for the season, but this will be slow work. The subject is one which both sides recognize had better be approached with great deliberation, and there is every advantage in delaying the adjustment until the actual conditions under which the season's business is to be carried out are definitely known. Things are in an ascending scale and it is expected that the cost of operation will be higher this year than last, so that a mistake would be made in entering into lake freight contracts now, excepting at prices that would not be considered by the shippers.

## TROUBLES OF THE TUG OWNERS.

If one important question, what to do with the men who remained in the employ of the Great Lakes Towing Co. during the long-protracted strike last summer, could be disposed of, there would be no trouble in bringing about an agreement as to wages, hours of labor, etc., between the tugmen and their employers for the coming season. Both sides have, of course, expected this difficulty, as it was not agreed, when a contract ended the strike last summer, that the non-union men who remained in the employ of the company should be discharged at the end of the season. It was simply understood that the contract was to stand only for the season of 1902 and that everything was to be taken up anew for 1903. Thus the main cause of disagreement, the disposition of the men not in the union, is as much in evidence now as it has ever been, the union refusing to take them into their ranks and refusing to work with them, while the tug company insists that they must be protected at all hazards. Of course efforts were made to secure for the men in dispute—there are some thirty-five or forty of them—reinstatement in the union in advance of negotiations for the coming season's contract between the union officials and officials of the tug company, but the efforts were of no avail.

The management of the towing company seems to fear a struggle similar to that of last year, no matter how earnestly they may be trying to avoid it, as is evidenced by their affiliation with the dredge interests. The dredging concerns employ a very large number of tugmen and it is understood that their association, formed in Chicago last week, is to act in conjunction with the towing company on labor matters. It is quite probable also that the reorganized Lake Carriers' Association, in taking up this year for the first time direct dealings with the labor unions, must give attention to the tug situation. In this direction probably lies the best hope of a settlement of the tug difficulty.

The new organization of dredge companies is to be known as the Great Lakes Tug & Dredge Owners' Protective Association.

W. A. Lydon of Chicago is president and C. J. Connell is secretary. The executive committee is composed of T. C. Lutz of Chicago, James A. Smith of Cleveland, O. S. Dixon of Milwaukee, E. P. Williams of Duluth and P. B. McNaughton of Buffalo.

## NEW AIDS TO NAVIGATION.

The main object of the recent visit to Washington of President Wm. Livingstone, Counsel Harvey D. Goulder and Treasurer Geo. P. McKay of the Lake Carriers' Association was to secure in the sundry civil appropriation bill certain appropriations for lighthouses and other aids to navigation that are urgently needed on the lakes. They succeeded in securing in the bill, through senate amendments, all the items they were working for and have the promise of Senators Hanna and Burrows, as well as Congressman Burton, that the items will be looked after in conference and until the bill becomes law.

Of course this bill contains large appropriations for the improvement of harbors and connecting waterways of the lakes under the continuing contract system, but it was the new appropriations for lights, fog signals, etc., that needed attention more so than the fixed items of a river and harbor kind which are assured each year when once placed on the continuing contract list.

The new lighthouse appropriations for the lakes are: To Lake Carriers' Association for maintenance of private lights in lower Detroit river and for Southeast shoal lightship, Lake Erie, \$8,000; new tender for St. Mary's river, \$75,000; light and fog signal, Middle island, Lake Huron, \$25,000; Spectacle reef light structure, improvements, \$54,100; light and fog signal station, Milwaukee breakwater, \$75,000; Point Aux Barques, Michigan, light and fog signal station, \$32,000; light tower and fog signal, Racine reef, \$75,000; relief lightship for ninth and eleventh lighthouse districts, \$30,000; lightship for St. Martin's reef, Lake Huron, \$35,000; additional lights, Isle Aux Peches range, \$18,000.

The light tender for St. Mary's river will render valuable assistance. The lighthouse authorities now contract to have a boat patrol the channels of the river every day. This is necessary in order to protect the channels against the removal of stakes and the displacement of other aids to navigation. This work is done at a very considerable expense. The service is at present supplied by a rented vessel, engaged by the government from year to year, but in order to adequately perform the work required it is necessary that there should be a boat specially constructed and fitted up for lighthouse purposes. The new boat will have tanks to carry compressed gas to supply the numerous gas buoys in the channels; a hoisting plant for taking up and locating stakes and for taking care of other moveable aids to navigation. The boat will also probably be able to cut through ice.

The Middle island light is needed to make available the harbor of refuge behind Middle island, and to mark a turning point in the regular course of vessels bound up or down the shores.

The Spectacle reef appropriation is for reconstruction of the lighthouse at that point. This lighthouse is on an isolated reef in the northern part of Lake Huron. It was originally intended that the material of the tower should be granite, but by reason of a failure of a contractor lime stone was adopted. This material cannot resist the continued pounding and surging of the lake ice in the winter season. Certain cribs were used in the original construction which have been retained as part of the structure. These have been undermined and are in a serious condition of decay. There was danger that the investment already made by the government at this point would be rendered useless or very seriously impaired, hence the appropriation.

The Lake Carriers' representatives also sought an appropriation for a light and fog signal on Rock of Ages, Isle Royale, Lake Superior, but they were quite satisfied to waive their claims as to this item, in view of success in other respects. This light is needed, however, and an appropriation for it will probably be made next year. Rock of Ages is located near the western end of Isle Royale, north shore of Lake Superior, and during the season of southerly and westerly winds many vessels bound to and from Duluth, by taking a course along the north shore of the lake and in lee of Isle Royale, are enabled to run when the lake is too rough for the southerly course. A light and fog signal on the dangerous rocks off the westerly end of Isle Royale, of which the Rock of Ages is one, is required in order to safely navigate this course. Not less than \$125,000 will be needed to establish a light and fog signal at this point.



## LAKE SHIP YARD MATTERS.

It is hoped that the strike at the Chicago works of the American Ship Building Co. will not extend beyond that plant, but the fear of further labor troubles has caused the ship builders to actually refuse business running far into the future. No doubt the order, a few days ago, from the Messrs. Hawgood of Cleveland for one steamer would have been for two, one of them to come out in the spring of 1904, but for uncertainties in the labor situation. The Craig works at Toledo and the other so-called independent yards are also practically filled up for 1903 and are not disposed to go after further new business at present. The Columbia Iron Works of St. Clair is, however, said to be figuring on two steamers for Pacific coast service and these would be vessels that could not be completed within the present year.

One of the steamers for the Great Lakes & St. Lawrence Transportation Co. (Wolvin line) was launched at the Wyandotte yards of the Detroit Ship Building Co. last week. The new vessel was christened S. M. Parent. She is 255 ft. over all, 241 ft. keel, 41 ft. beam and 18 ft. deep. Her engines are triple-expansion, 15, 25 and 42 by 30 in. stroke, supplied with steam from two Scotch boilers, 11 ft. diameter by 11 ft. long.

The steamer G. W. French was successfully launched last week from the West Bay City ship yard of the American Ship Building Co. for C. W. Elphicke and others of Chicago. The new steamer is 376 ft. over all, 356 ft. keel, 50 ft. beam and 28 ft. deep. She has triple-expansion engines 20, 33½ and 55 by 40 in. stroke, supplied with steam from two Scotch boilers 12½ ft. in diameter and 11½ ft. long.

## AROUND THE GREAT LAKES.

There is no truth in the reported sale of the Mitchell steamers Lagonda and McWilliams.

The schooner Grace Holland, formerly operated by the Republic Iron Co. has been sold to Capt. Nagle.

Samuel Peck, a Lake Superior pioneer, died at Lake Maitland, Florida, last week. He was a resident of Marquette and was engaged in iron mining in the early days.

John Pauly has made an addition to his fleet of four steamers by the purchase of the steamer John Duncan from John Duncan of Green Bay. She will be used to tow the barge Aberdeen.

Thos. F. Madden, a well known vessel owner, died at his home in Bay City last week. His death was due to paralysis. He was forty-nine years old and had lived in Bay City for thirty years.

Edward Smith, a pioneer lumberman, died at Detroit Thursday, aged seventy-five years. Mr. Smith was a member of the old firm of Gratwick, Smith & Fryer, and was very well known in the lake trade. Two steamers were named for him.

Officers of Algonac harbor (No. 53) American Association of Masters and Pilots of steam vessels, elected recently, are: Captain, R. C. Jackson; first pilot, F. D. Galton; second pilot, B. D. Townsend; purser, James Brines; captain's clerk, F. R. Hemenger.

Capt. Frederick J. Simpson has been appointed master of the side-wheel steamer City of Mackinac of the Mackinac division of the Detroit & Cleveland Line. He has been in the employ of the company for fourteen years and has been on the City of Mackinac since 1892.

Two of Cleveland's leading vessel owners, J. C. Gilchrist and John Mitchell, are evidently not anticipating an early move towards freight contracts for the coming season. Mr. Gilchrist is in New Orleans and Capt. Mitchell is about to start for California on a business trip.

Joseph Randall, a well-known lake captain and pilot, died at his home in Algonac, a few days ago, having succumbed to a stroke of paralysis. He was seventy-eight years of age. Capt. Randall began sailing at the age of fifteen years, and continued until 1894, when he retired because of ill health.

Officers M. E. B. A. No. 51, Muskegon, Mich.: President, Den. McMillan, 105 4th st.; vice-president, M. Reck, 241 Muskegon av.; recording secretary, Dennis McMillan, Terrace st.; corresponding and financial secretary, H. L. Connell, 12 Ransom st.; treasurer, M. Reck, 241 Muskegon av., chaplain, H. O'Hara, 38 Ambrosia st.; conductor, P. Fredrick, 32 Blodgett st.; door-keeper, A. Lamorcaux, 19 Cherry st.

A great deal of useless talk has been heard of late about pilots on salt water fearing an invasion from men of the lakes, and about a law to prevent lake pilots from taking command of vessels on the seaboard until they have had actual experience on seaboard waters. Such is the law at present, and everybody interested in ships is agreed that on the lakes as well as on the seaboard the applicant for license, no matter what his qualifications may be, should have had actual experience on the waters for which he seeks license.

It is not probable that the management of the large fleet of steel vessels owned by the United States Transportation Co. of Cleveland will be transferred to new hands on account of the death of Capt. W. W. Brown. No definite action will be taken until after the funeral, which will occur upon the arrival of the remains from Europe, but it is expected that Capt. Brown's office force will be continued under the direction of Mr. W. H. Wilkinson and other officers of the company who have been in close

touch with the vessel affairs. Capt. Brown carried a very large line of life insurance.

Capt. Duncan Nicholson, last year in charge of the steel steamer Thomas Adams, has been appointed to command of the steamer Geo. L. Craig, building at the works of the Craig company, Toledo, for the Adams Transportation Co. Henry McCallum, master of the Langham last year, has been promoted to the Adams, and Capt. D. J. Duncanson who sailed the Ira H. Owen for several seasons, has been appointed master of the Langham. Capt. Duncanson sailed for Mr. Adams twelve years previous to service on the Owen, and only left his employ when the older boats were sold. J. A. Duncanson, brother of Capt. D. J. Duncanson, last year master of the steamer Jesse H. Farwell, has received his appointment as captain of the new steel steamer S. A. Parent of the Great Lakes & St. Lawrence Transportation Co.

## CHICAGO TUNNEL SUGGESTION.

Editor Marine Review:—I notice that the city of Chicago is going to ask the present legislature for permission to issue bonds for \$1,500,000 to perpetuate the La Salle and Washington street tunnel nuisances. These two tunnels cost to build more than \$1,000,000. The people declined to use them from the beginning, preferring to use the bridges. They were given away to the traction companies. The foot-paths in these tunnels are virtually abandoned, as the people cannot be tempted to make use of them. These two tunnels have already cost the shipping, transportation and other industries of Chicago at least \$10,000,000. When these tunnels were built, no one expected that the growth of vessels and shipping at Chicago would ever require more than 17 ft. of water. How much water will there be for floating vessels over the top of the tunnels when they are lowered at a cost to the taxpayers of \$1,500,000? New York, Boston and other modern ports are being dredged to secure 40 ft. of water and the tops of tunnels are being placed more than 50 ft. below low water. If the tops of the tunnels at Chicago are placed only 26 or 30 ft. below low water, how soon will it be necessary to lower them again? The new State street bridge costs only \$165,000 and gives twice the width for highway traffic of either tunnel. Would it not be better to build bascule bridges at La Salle and Washington streets and then remove the tops of these tunnels? This would give immediate and permanent relief to navigation. The grades of the bridges would be very slight, while the grade to the tunnels would be dangerously steep, even for street car traffic. The two bridges, accommodating twice the traffic of the two tunnels, could be built for less than \$400,000, as demonstrated by the new State street bridge.

Chicago, Feb. 25, 1903.

T. K.

## FAVORS DISCRIMINATING DUTIES.

Editor Marine Review:—After what has happened in Washington within the past week, Senator Hanna should certainly give up forever as impracticable that matter of subsidy for the general marine. The objects will always lie against it. First, subsidy or bounty to the carrying trade or any other business or calling is not provided for by our constitution. The states may pay bounties, and many of them do for different purposes. They never gave up to the general government their power to do so, and the general government never got from the states or people any power or right to use the proceeds of taxation for purely private purposes. The constitution provides a way for the protection of navigation. In large part the cause of its construction and adoption was to establish this protection. We must therefore take the way of the constitution or amend it. The second reason is that the people will not consent to tax themselves for ship subsidies. We have an illustration of this in the recent action of the house committee on marine and fisheries. Eleven Republicans and six Democrats constitute that committee—seventeen in all. Of these representatives of the people ten opposed and but seven favored the Frye bill. It could not be reported out. Thus, about one-third only of what was supposed to be, when appointed, a cock-sure machine for subsidy would act as imagined. If reported out and before the house about the same showing of unpopularity would eventuate. So, what is the use of kicking against the people with the constitution on their side? Besides the constitution and the people are right. Subsidy ground is not solid, is not statesmanlike. Its premises are unsound, false in fact, and in philosophy. The people can discern these things. Senator Hanna should not have aided in breaking the platform promise of 1896, "to reform our policy, and to return to the enforcement of the constitution by 'discriminating duties.'" In this he did not show his usual shrewdness.

SHIP'S FRIEND.

The installation of sixteen Niclausse boilers for the first of the Great Northern liners building at New London, Conn., has been completed at the works of the Stirling Co. at Akron, O., complete with drums, headers with tubes and casings. The set is now awaiting shipment and is reported as being the biggest boiler job for a merchant vessel ever turned out in the United States.



## APPOINTMENTS OF MASTERS AND ENGINEERS.

Mitchell & Co., Cleveland: Steamers—Moses Taylor, Capt. C. B. Galton, Engineer Wm. Fetting; F. H. Goodyear, Capt. H. A. Stewart, Engineer Wm. Fritz; W. H. Gratwick, Capt. R. C. Jackson, Engineer Chas. Love; H. S. Holden, Capt. F. D. Galton, Engineer John Scott; Walter Scranton, Capt. H. H. Townsend, Engineer Gus Guy; W. E. Reis, Capt. B. D. Tonwend, Engineer Louis Minnie; J. J. McWilliams, Capt. M. M. Stewart, Engineer Henry Graves; Lagonda, Capt. Fred Furtaw, Engineer I. A. Frankscombe; H. C. Frick, Capt. W. W. Shorkey, Engineer F. B. Parker; Jas. Gayley, Capt. J. D. Baird, Engineer John Maedel; J. J. Albright, Capt. J. W. Auttersson, Engineer Peter Lavelly; M. A. Hanna, Capt. Alex. Begg, Engineer J. D. Riley; R. L. Fryer, Capt. —, Engineer Frank Thomas; Major, Capt. —, Engineer —: Geo. T. Hope, Capt. —, Engineer Gilbert Newton. Schooner—Troy, Capt. Henry C. Diem.

Pere Marquette R. R. Co., Ludington, Mich.: Steamers—Pere Marquette, Capt. J. C. Ackerman, Engineer Robert Thielman; Pere Marquette 16, Capt. G. L. Thompson, Engineer Chas. Sylvester; Pere Marquette 17, Capt. Jos. Russell, Engineer A. W. Ackerman; Pere Marquette 18, Capt. Peter Kilty, Engineer Samuel Sylvester.

Rhodes, R. R., Cleveland: Steamers—Yale, Capt. James Jackson, Engineer Harry Stone; Minneapolis, Capt. Geo. Moore, Engineer D. J. McMillan; St. Paul, Capt. Peter Thompson, Engineer Henry Stone; Wm. Castle Rhodes, Capt. P. Dowdell, Engineer Guy Hemenger; Huron, Capt. Washington Moore, Engineer Clinton Folkerts.

Smith, Edward, Buffalo: Steamers—Thomas Cranage, Capt. John S. McNeil, Engineer Jos. Blanchett; City of Paris, Capt. E. D. Ballentine, Engineer James McDougall.

Tomlinson, G. A., Duluth: Steamers—Sultana, Capt. J. H. Driscoll, Engineer M. J. McAuliffe; Sonora, Capt. F. A. Fick, Engineer T. H. Welsh; Yosemite, Capt. G. W. McCullagh, Engineer —; Sinalva, Capt. W. D. Ames, Engineer F. A. Steadley; Sonoma, Capt. A. H. Reed, Engineer —; New steamer, Capt. D. P. Craine, Engineer A. B. Fortier.

Graham & Morton Transportation Co., Chicago: Steamers—City of Chicago, Capt. Wm. Russell, Engineer Wm. J. McClure; City of Milwaukee, Capt. John Stewart, Engineer C. L. Banon; Puritan, Capt. Wm. A. Boswell, Engineer James Stewart; Argo, Capt. Ed. Williams, Engineer Wm. T. Johnson; Soo City, Capt. A. J. Simons, Engineer —.

Carter, E. D., Erie, Pa.: Steamers—Panay, Capt. C. H. Wilson, Engineer Ogg; Luzon, Capt. E. A. White, Engineer Jno. Stevens.

Cleveland & Buffalo Trans. Co., Cleveland: Steamers—City of Erie, Capt. H. McAlpin, Engineer J. Y. Rendall; City of Buffalo, Capt. W. H. Smith, Engineer Chas. Lorimer.

Dunham, R. J., Chicago: Steamers—Ravenscraig, Capt. Geo. E. Atkinson, Engineer Geo. F. Wilson; City of London, Capt. Wm. Anderson, Engineer Wm. Nichols; Black Rock, Capt. John F. Hansen, Engineer Chris. Howard.

Eddy-Shaw Transit Co., Bay City, Mich.: Steamers—E. C. Pope, Capt. Wm. A. Williams, Engineer Wm. C. Anderson; Selwyn Eddy, Capt. Wm. Greening, Engineer John F. Quinn; Penobscot, Capt. Geo. C. Stevenson, Engineer Edward A. Hoffman; City of Bangor, Capt. A. J. Mahon, Engineer John M. Conroy.

Elphicke, C. W., Chicago: Steamers—Mary C. Elphicke, Capt. Jos. Mathews, Engineer S. C. Davis; Wm. L. Brown, Capt. John Massey, Engineer John Goulding; G. Watson French, Capt. L. B. Cummings, Engineer W. H. Walder.

Gilchrist, F. W., Alpena, Mich.: Steamers—Viking, Capt. H. Richardson, Engineer L. Richards; S. C. Hall, Capt. John Place, Engineer —. Schooners—Vinland, Capt. T. Stevens; Sam Flint, Capt. B. M. McCaffery; Nellie Mason, Capt. R. Mitchell.

Hutchinson & Co., Cleveland: Steamers—Germanic, Capt. James Murphy, Engineer Geo. Blauvelt; J. T. Hutchinson, Capt. J. H. Smith, Engineer Robt. Smith; City of Glasgow, Capt. W. P. Benham, Engineer P. Lyons; Queen of the West, Capt. S. F. Massey, Engineer —; Rube Richards, Capt. Robt. Kerr, Engineer Anton Rud. Schooners—Abyssinia, Capt. T. K. Woodard; E. C. Hutchinson, Capt. J. J. Martin; May Richards, Capt. A. McGougan.

McVittie, Alex., Detroit: Steamers—Senator, Capt. W. A. Irvine, Engineer W. J. Bolton; Colonel, Capt. A. Ames, Engineer A. Cobo.

## TRAFFIC OF PORTAGE LAKE SHIP-CANALS.

Alike to the great waterway at the Sault, the ship-canals of the Portage lake district (copper country of Lake Superior) are owned by United States government, and as they are under control of officials of the war department, accurate statistics of this commerce are obtainable each year. Capt. D. D. Gaillard, United States engineer at Duluth, recently completed reports of traffic through these canals. For the season of 1902 the registered tonnage of vessels passing through these canals is 2,550,493, the tons of freight 2,532,323, and the estimated value of freight

\$65,326,818.80. The different items of freight for 1902, with quantity and values, are shown in the following table:

A DETAILED STATEMENT OF FREIGHT PASSING THROUGH PORTAGE LAKE SHIP-CANALS DURING SEASON OF 1902, TOGETHER WITH ESTIMATED VALUE OF SAME.

Items	Designation.	Quantities	Price per unit.	Valuation.
Coal, (anthracite).....	Net tons	70,011	\$6.25	\$ 437,568.75
Coal (bituminous).....	Net tons	988,274	4.00	3 993,096.00
Flour.....	Barrels	448,290	4.00	1 793,160.00
Wheat.....	Bushels	839,380	.74	621,141.20
Grain (other than wheat)...	Bushels	280,010	.50	140,005.00
Flax.....	Bushels	732,159	1.50	1,098,238.50
Manufactured iron.....	Net tons	21,304	65.00	1 384,760.00
Pig iron.....	Net tons	1,588	21.00	33,348.00
Iron ore.....	Net tons	193,536	2.25	435,456.00
Copper.....	Net tons	87,055	250.00	21,763,750.00
Building stone.....	Net tons	34,901	7.00	244,307.00
Limestone.....	Net tons	53,984	1.50	80,976.00
Oils.....	Barrels	27,275	7.00	190,925.00
Salt.....	Barrels	142,711	.60	85,626.60
Sand and Gravel.....	Cu. yds.	22,199	1.00	22,199.00
Lumber.....	M. ft. B.M.	344,627	15.25	5,255,561.75
Logs.....	M. ft. B.M.	31,140	12.50	389,250.00
General merchandise.....	Net tons	182,383	150.00	27,357,450.00
Total.....				\$65,326,818.80

Compared with previous years the number and tonnage of vessels, tons of freight and value of freight in 1902 were as follows:

Year	Number of vessels	Reg. tonnage of vessels	Total freight, net tons	Total value of freight
1902	4 631	2,550,493	2,532,323	\$ 65,326,818.80
1901	3,921	1,892,901	2,116,624	56,876,480.65
1900	4,020	1,749,291	1,867,772	57,380,129.05
1899	3,931	1,967,883	1,582,169	54,994,843.70
1898	3,909	1,447,216	1,367,635	39,254,415.50
1897	2 931	1,025,375	1,020,723	34,044,268.85
1896	3,569	1,076,548	1,041,933	29,953,787.02

The number of passengers on vessels passing through the canals in 1902 was 24,542 up-bound and 23,445 down-bound, a total of 47,987.

## MR. J. J. HILL ON HIS PACKAGE FREIGHTERS

Concerning the sale of the freight vessels of the Northern Steamship Co. to a syndicate representing the Erie, the New York Central, the Lackawanna, the Lehigh Valley and the Pennsylvania railroads, Mr. J. J. Hill of the Great Northern railway gave out the following interview in St. Paul a day or two ago:

"We still own the passenger steamers North West and North Land," said Mr. Hill, in speaking of the transfer. "Those steamers will continue to be operated by the Great Northern, but we had no more use for the freight boats. They were built for a purpose, and when the purpose was accomplished we were ready to let them go. When we built those boats lake freights were high and elevator charges in Buffalo amounted to a cent and a half a bushel. When we built our elevators we put elevator charges down to half a cent a bushel and made a deep cut in freight rates between Duluth and Buffalo. There was only one man in the state at that time who understood and appreciated what the Great Northern had done for the farmers of the northwest in reducing those freight rates and elevator charges, and that man was Ignatius Donnelly. He was in Buffalo when our elevator was opened and investigated our charges and reported it in his paper. But we don't want any more lake business. Buffalo is a long way from here and it is hard to manage interests that are so widely scattered. Besides, if the other people wanted our boats and were willing to pay a fair price for them, let them have them. We are tired of fighting other people's battles anyhow; let them fight their own. That's why the boats were sold, and I don't care what the new owners do with them."

## LACKAWANNA STEEL CO.'S RESOURCES.

The offering of the Lackawanna Steel Co.'s new bonds has brought forth inquiries regarding the company and the following official information explains in answer to the proposition of the company:

"The company has ore properties in Minnesota, Michigan, Wisconsin and New York, on which there are said to be 56,000,000 tons of ore in sight. The company also owns and holds in fee 21,720 acres of bituminous coal lands in Pennsylvania. It also has blast furnaces at Colebrook, Pa., and coke ovens at Lebanon, Pa., and owns in addition the Cornwall & Lebanon railway and the Cornwall & Lebanon Iron Co. Reverting to the company's new plant at West Seneca, N. Y., it will be interesting to know also that a canal has been constructed from Lake Erie to the company's plant, thereby affording cheap and prompt transportation facilities for the handling of ore from the northwest and for the shipment of manufactured product. This new plant will be equipped with electrical power, transmitted from the power plant at Niagara Falls. It will readily be seen that these facts are of prime importance in considering the position of the company. The Lackawanna Steel Co. is the successor to the Lackawanna Iron & Steel Co."



## CANADIAN SHIPPING AND SHIP BUILDING.

The hull of a new cruiser for the fisheries protection service on the Pacific coast for the Dominion government, was launched at Vancouver, B. C., Feb. 14.

Thomas Hodgins, K. C., has been appointed local judge in admiralty for the exchequer court for the district of Toronto, in place of Judge McDougall, deceased.

The Stanley Dollar Steamship Co., Ltd., has been organized at Victoria, B. C., with a capital of \$50,000. The company has purchased the steamer Silver Dollar, now registered at St. Thomas, in the Danish West Indies, and will bring her out to the coast.

The Port Stanley Navigation Co. has paid a dividend of 10 per cent. on its first year's operations and elected the following directors for 1903: Col. Lees, J. Tanbon, H. M. Douglas and Mr. Douglas of London; W. A. Day of Port Stanley; G. Crocker, A. M. Hutchinson, J. Walton, E. McCreddie and E. A. Smith of St. Thomas.

The stern-wheel steamer Hamlin, built for service on the Stikine river in the early days of the rush to the Klondike and owned by the White Pass & Yukon railway, has been sold to Victoria parties. It is intended to rebuild the steamer and enter into competition with the two existing services on the Skeena and Stikine rivers.

Wm. Peterson of Newcastle-on-Tyne, Eng., who successfully introduced the turret type of steamer on the great lakes in 1902, has arranged for an ocean line of steamers to sail from Montreal to Rotterdam. The first sailing will be April 15 from Rotterdam and the steamers will carry freight on through bills of lading to all parts of Canada.

J. J. Long is authority for the statement that the Collingwood Ship Building Co. has practically concluded contracts for two additional steel steamers, one 257 ft. in length and the other a few feet shorter. One of them is to be delivered in September. No information is yet available as to the owners or dimensions of the proposed new steamers.

The St. Joseph Transportation Co. will apply at the next session of the Dominion parliament for incorporation to construct a canal from St. Joseph on Lake Huron to Lake Erie. There are already in existence charters for two other canals to connect the waters of the two lakes, but neither of them have been able to attract the necessary capital to carry out their undertaking.

The annual meeting of the shareholders of the Richelieu & Ontario Navigation Co. was held in Montreal Feb. 19. The annual report showed gross receipts, \$1,036,666, operating expenses \$840,449, fixed charges \$21,632, net profits \$174,584, against gross receipts \$1,109,458, operating expenses \$920,569, fixed charges \$22,792 and net profits \$166,097. A dividend of 6 per cent. was declared.

The legislature of Jamaica has offered a subsidy of \$12,500 a year for a new fast direct steamship service between Kingston and other Jamaican ports and Canada. Negotiations are in progress with the Canadian government with a view of a Dominion subsidy being obtained. A direct freight service between St. John, N. B., and Kingston was inaugurated in 1902, and has been carried on with success.

There will be launched at Shelbourne, N. S., next week, the new Westport for the Insular Steamship Co. Her dimensions are: Length, 103 ft.; beam, 21.3 ft.; depth of hold, 8.8 ft. She will have cabin accommodation for fifty passengers and general accommodation for 100 more, with large cargo carrying capacity and will have a speed of 10 miles an hour. The Westport is for general trade along the Nova Scotian coast.

Capt. Batten and Capt. Oulette, who piloted the Richelieu & Ontario Navigation Co.'s new steamer Montreal through the Lachine rapids at the end of the season of 1902, have been presented with gold watches by the company. The Montreal is nearly 100 ft. longer and drew 1 ft. more water than the largest steamer that had previously run the rapids, and in addition there was 1 ft. less depth of water in the river at the time.

The Niagara Navigation Co. has appointed John Foy, late general manager, to be president, and B. W. Folger, at one time general manager of the St. Lawrence River Steamboat Co., general manager. It is now looked upon as certain that the company will not be taken over by the Richelieu & Ontario Navigation Co., the appointment of Mr. Folger to general manager being regarded as an additional step in the direction of a consolidation of steamship lines on Lake Ontario, the St. Lawrence river and some of the smaller stretches of inland navigation north of Lake Ontario, under the control of the New York Central railroad.

Within the last two years the masters and mates in seven of the principle centers of navigation in Ontario organized and enrolled so many members that it has been found desirable to organize a Grand Association of the Canadian Order of Masters and Mates. The first meeting was held at Collingwood when the following were elected officers: Grand president, Jas. Wilson, Collingwood; grand vice-president, W. C. Jordan, Collingwood; grand secretary, W. Ireland, Parry Sound; grand treasurer, Capt. McKay, Owen Sound; grand conductor, M. Leroux, Midland; grand tyler, W. Bell, Penetanguishene; grand auditors, G. H. Playter and Capt. McIntyre, Parry Sound. Branches of the association exist in Collingwood, Midland, Owen Sound,

Parry Sound, Penetanguishene, Sarnia and Toronto. A special organization committee was appointed to visit other centers and enlist the active co-operation of the masters and mates residing there.

The Canadian Pacific Railway Co. announced a year ago that it intended to engage in the transatlantic trade, and a definite announcement of its program will be made at or just prior to the regular meeting of stockholders to be held shortly. During the year the company's plans have been perfected and negotiations carried on in regard to steamers, etc. For the present, at any rate, the company will use Montreal as a summer port and St. John during the winter months. The object of the company in establishing its own line is to be enabled to carry the freight brought to the seaboard by its lines across the ocean without having to rely on independent lines of steamships, or on space offered on the steamers controlled by other railways. With the Dominion and Leyland lines, starting from Montreal and Quebec, under control of the International Mercantile Marine Co., the company was forced to take steps to secure its own line, as the available cargo capacity open for charter was thereby reduced. The company has practically concluded negotiations with the Elder, Dempster Co. for the purchase of a number of their largest freight carriers, but it is the intention of the company to build a number of steamers of the largest size to add to the line.

## TO IMPROVE MIDDLE CHANNEL, ST. CLAIR RIVER.

President William Livingstone of the Lake Carriers' Association was especially instructed at the recent meeting of stockholders in Detroit to induce congress to improve the middle channel of the St. Clair river. It is desired, if possible, to provide for the preliminary surveys during the coming summer. The following communication, concerning the improvement, was presented to the association:

"The association will remember that the year 1902 was no exception to the general rule of past seasons in respect to loss of life and property in the south channel, from the point above its source at the head of Russell's island to the ship canal or cut at the St. Clair flats. It is well known to all familiar with lake navigation that the southeast bend in the south channel, because of its great depth and sharp turn, has been the cause of a very large destruction of property and loss of life. But nature has provided, on the American side of the boundary, a safe, wholly practicable and cheap outlet, in the middle channel, when improved by dredging, so that all steamers and vessels downward bound may take that passage and thus eliminate all risk of collision and forever preclude an extension of this startling record of loss of life and of property heretofore made in navigating the south channel. It is now possible, if not quite probable, that two of the largest steamers on the lakes, if meeting and attempting to pass in the swift current at the southeast bend, (whose center is the boundary line), may collide and sink in such a manner as to entirely obstruct the channel; and, moreover, that the extreme depth of the water there might prolong the raising of the consequent blockade for a long time, and possibly necessitate the destruction of one or the other of the ships at a great pecuniary loss, to say nothing of the possible loss of life. Moreover, the currents of the north and middle channel are very much stronger than that of the south channel for the greater part of its length, and as ships downward bound, taking the middle channel, improved as proposed, could run at full speed, except in the dredged channel; they could make much better time than in the south channel, and have the risk of collision entirely eliminated; while to this may be added that by ships upward bound taking the south channel—which by regulations they might be compelled to take—a similar risk in that channel would be avoided."

## AN IMMENSE LUMBER DEAL.

Duluth Minn., Feb. 17.—Mr. W. H. Gilbert, a leading lumberman of this district and owner of a sawmill and much timber here, has just closed a remarkable and immense timber deal. He has bought between 3,000,000,000 and 4,000,000,000 ft. of standing pine on the Bahama islands, chiefly on the Grand Abaco, Great Bahama and Andros islands, and has secured from the British government permits for cutting and manufacturing as soon and as fast as desired. He is now on his way to the islands accompanied by his chief logger and by manufacturing experts to make a survey that shall determine when, where and how manufacturing shall be begun. The timber is yellow pine, similar to that of the south Atlantic states. There is in connection with the pine a considerable amount of mahogany, which Mr. Gilbert has also bought and which is probably worth an immense sum.

This timber will be exported to Liverpool, and will not come to the United States until the duty is taken off lumber. It is chiefly adapted for ties, car sills, and other special bills of long timber requiring exceptional strength, such as piling. The trees are small but very straight and tall. The price at which this vast amount of timber was secured is ridiculously small. Mr. Gilbert was on a search for some of the neglected opportunities of the lumber world when he ran across it. Mr. Gilbert is cutting 60,000,000 ft. here and at Ashland this year, all of which goes east by lake.



## EARLY DAYS ON LAKE SUPERIOR RECALLED.

[From a Special Correspondent]

Lansing, Mich., Feb. 12, 1903.—There occurred an unusual spectacle at the state house last evening when two pioneers of the Lake Superior section of the state addressed the members of the legislature informally in the representative hall, which by a resolution of the house had been tendered to them for such purpose. Gov. Bliss presided and nearly all the members of both houses were present. The two pioneers were both septuagenarians but hale and hearty, and were most cordially received, as it was known that they only remained of that class who were prominent, and could speak of a full half century's experience and observation of the industrial progress made in that section of the state for over fifty years past.

One was the Hon. Peter White, president of the first national bank of Marquette and of the upper lake region, and a former state senator, and the other was Charles T. Harvey, who was for many years a resident in the same district with Mr. White, first as manager and chief engineer of the constructing company building the original Sault or state canal, also as builder of the first public road across the peninsula to Lake Superior, and later as promoter and chief engineer of the first railway to those waters, but at present president and chief engineer of a new railway line in Canada—with a residence at the dominion capital.

Mr. Harvey spoke first, and for over an hour kept the audience in wrapt attention while he stated some of his experiences in securing national aid for railways in Michigan in the shape of land grants in 1856 amounting to several millions of acres. This result he declared was owing first to his being left behind at Ontonagon by the last steamer which passed east along the south coast in the fall of 1855, necessitating his snow-shoeing across the district to the head of Kewenaw bay, (his companion being Mr. E. C. Hungerford, now residing at Chester, Conn., and one of the leading citizens and president of the bank in that town), and then for want of even a trail southward embarking in a small row boat and following the coast for 150 miles to Marquette, in the month of December with several narrow escapes from death enroute. In continuing south he traversed the entire length of Green bay, 120 miles, on the ice, and then by sleigh to Fond Du Lac at the south end of Lake Winnebago in Wisconsin, which was as far north as railways then extended. The journey consumed about a month. These delays and exposures led him to go to Washington to promote aid for a railway to Lake Superior. He attributed his success mainly to making a studied effort to gain the favor of the southern members who controlled congress at that time. This he did drafting a map and having it lithographed on a large scale showing a continuous line from Marquette on Lake Superior to Mobile on the bay of that name, being an estuary of the Gulf of Mexico. He gave an amusing account of the want of faith in the idea by members from the lake states, but which was more than counterbalanced, however, by the enthusiastic support of the southern members after the map had been displayed to them. The outcome was a grant of land to each of the states through which the route ran, to aid in its construction, and every mile had since been built and is now in use.

A copy of the map which effected this result he said was still in existence and he contemplated presenting it to the state with a detailed account of his trip, printed, to accompany it for preservation in the state library. The snowshoes he then used he presented soon after to a friend who caused them to be preserved in a public institution in New England, namely the Fairbanks museum at St. Johnsbury, Vermont, where he saw them not long since.

At the next session of the legislature, which was in 1857, he was in attendance as an interested party concerning the disposition of the land grants which he had been the chief factor in obtaining. He then had an office at Marquette and as his friend Mr. White was elected as the local member of that legislature, they started from that point together, and he would leave it to him to speak of their joint experience on that trip. He recalled, however, the remarkable coincidence that the hall of representatives in the old state house was by resolution tendered to him to address the members of the legislature of 1857 on the resources and commercial prospects of the Lake Superior region. The members of both houses attended and the then governor, Bingham, presided and introduced him to the audience. He then read from a book published that year, the existence of which was not known to him until sent to him by a friend, in which lengthy extracts from his address as reported in the Lansing and Detroit papers at the time, were quoted, particularly the sentence in which he predicted that within twenty-five years the commerce of Lake Superior passing through the St. Mary's river would equal that then finding its way through the St. Clair river. His prediction was at that time made the occasion of considerable good natured banter by persons in the audience, especially by the late Capt. Eber B. Ward, owning the largest amount of vessel tonnage on the lakes, who happened to be present. At the end of the quarter century mark his prediction was verified with a wide margin in excess. Now forty-six years later on a similar invitation he was again addressing the legislature with the governor now, as then, presiding, and the figures of the traffic passing through the St. Mary's river now reached the enormous total of about 36,000,-

000 tons. Had he in his first address made an estimate of such results his sanity would have been doubted!

On the conclusion of Mr. Harvey's address Mr. White proceeded to give an account of their joint trip in 1857. They were nineteen days on the way from Marquette to Lansing, and when coasting along Green bay on a December night were in great peril from the rapidly forming ice abrading the sides of their thinly-sheathed boat. Both of the speakers urged legislative sanction and aid on a liberal scale of the semi-centennial celebration of the commencement of the Sault canal on June 4 next.

They also spoke enthusiastically of the plan of securing the site of Old Fort Michili Mackinac on the south side of the Straits of Mackinaw as a public reserve and erecting thereon a slightly monument which will be the only memento on this continent of the Chief Pontiac war, in which native savagery made its last notable stand against civilization in the great lakes region.

To those who remember the state canal days when most of the pioneers of the Lake Superior country were living factors in its progress, such as Amos R. Harlow, John Burt and Dr. M. L. Hewett of Marquette, Ransom Sheldon and C. C. Douglass of Portage Lake, D. S. Cash and A. R. Burtenshaw of Ontonagon, and John Hays of Cleveland (who sent the first consignment of lake copper to market), the appearance on the platform of the last surviving representatives of that class was an event of special interest not likely to be repeated. Mr. White, it was stated, went to Marquette in 1847 and Mr. Harvey first visited that location in 1852.

## IN FAVOR OF THE 1,000-TON BARGE CANAL.

At a meeting of the New York chamber of commerce last week resolutions were adopted approving the proposal before the legislature to improve the Erie canal and the Oswego and Champlain canals in the manner proposed by what is known as the 1,000-ton barge canal. In moving the adoption of the resolution Mr. A. B. Hepburn of the committee on internal trade made a speech which elicited great applause. He said:

"It is impossible not to feel annoyed at the trend of events with reference to the canals of our state. Several years ago we voted to expend \$9,000,000 in order to put them in efficient condition. The profligate expenditure of a portion of that sum and the total inadequacy of the sum appropriated to even approximately modernize canal transportation has had a baleful influence upon the canals ever since. In 1900 the legislature authorized the state engineer to make elaborate surveys and estimates of cost as to different routes. A report of more than 1,000 pages followed. This was supplemented by the report of the Greene commission and the United States board of engineers on deep waterways. We have been surfeited if not confused by the data furnished. Last year Gov. Odell recommended that the locks of the canal be enlarged to a 1,000-ton barge capacity and that the canal be deepened to 9 ft. This chamber endorsed the recommendations of the governor. Certain interests of this city went to Albany and, adopting the motto of a 1,000-ton barge canal or nothing, united with the rural opponents of the canal to defeat the act submitting the proposition to the people for approval. By their action they have brought the commercial interests of this state perilously near to the alternative—nothing.

"However, the proposition now pending is a 1,000-ton barge canal to cost something in excess of \$62,000,000, and certainly presents a question upon which this chamber must have views, and ought to express them. The canals were completed to a depth of seven feet in 1862, and since then nothing has been done to increase the navigable capacity of the canals. What have the railroads done in the past forty years? They have increased the maximum railroad train capacity from 300 tons, or 10,000 bushels of wheat to 2,700 tons or 90,000 bushels of wheat. The capacity of a canal boat plying the Erie canal thirty years ago was 220 tons, equal to 74 per cent. of a train load; today it is 240 tons, which equals .088 per cent. of the maximum train load of today. Since 1862 the New York Central & Hudson River railroad has increased the number of miles of road which it controls, and operates 9,650 miles, capitalized at nearly three-quarters of a billion dollars, gridironing the east and central west in its laudable ambition to reach and control business. The Baltimore & Ohio has spent for equipment, betterment and improvements in the past two years, \$15,000,000, and has contracted for or determined upon the expenditure of as much more. The Lehigh & Wilkesbarre has expended \$8,000,000 in the past two years for the same purpose, the Delaware, Lackawanna & Western \$10,000,000, the Erie \$7,500,000 and now has authorized a bond issue of \$50,000,000 for improvements and equipments. The New York Central has expended \$7,500,000 and is about to expend upon its terminals \$40,000,000. The greatest of all our railroads, the Pennsylvania, has expended \$45,000,000 recently to improve its efficiency, has a \$50,000,000 tunnel on hand, and bridge construction and other improvements the cost of which I won't venture to estimate. Curves must be straightened and grades reduced, the capacity and facility of equipment increased, and no one doubts, and no one questions, that it is wise economy and good business judgment. If it is wise economy and good judgment as applied to railroads, is it not incumbent upon the great state of New



York to apply those principles in the management of her system of canals?

"No prudent man would build canal boats of the present capacity with the impending prospect of having the capacity of the canals increased. Hence the present canal equipment is especially run down and decrepit. The necessity for action and early action is important.

"I was a member of the legislature representing one of the northern counties when the tolls were removed from the canals. I opposed making them free, not because I was opposed to the canals, but because I feared, as I then stated, that the time would come when the canals would be ground out of existence, between the upper and nether millstone of false economy on the part of some of the rural counties and inevitable rivalry of other carriers of freight. That pretty nearly describes the condition that confronts us today. The removal of tolls inured principally to the benefit of the handlers of freight at the terminals. An amendment of the constitution so as to leave the question of tolls in the discretion of the legislature would, I feel sure, inure to the benefit of the canals and the commerce of the state.

"In their present unsatisfactory condition the canal transportation for the year 1901 amounted to 3,420,613 tons, 1,113,617 tons of which had for its terminus the city of New York, or about 25 per cent. of the total. The canals should be maintained primarily as a regulator of the cost of transportation as fixed by the railroads, and for that purpose their annual worth to the commercial and business interests of the state would equal their annual cost.

"Secondly, they are needed to supplement as well as rival the railroad traffic of the country. When the anthracite miners' strike was declared off and coal was being mined in abundance the community still suffered because of the inability of the railroads to transport and deliver the same. There has been a terminal congestion of freight in all the larger cities and business centers of the country. Even the Pennsylvania railroad had to lay off its twenty-hour passenger train to Chicago in order that the trackage might be used in distributing freight of the company and relieving the congestion.

"Under these circumstances the great state of New York ought to conserve the business interests of its citizens and defend its own primacy by applying the principles and rules of management to the conduct of its canals which business experience and business foresight have proven to be necessary in order to preserve and promote the efficiency of private transportation enterprises."

#### THE CANADIAN PACIFIC PURCHASE.

Sir Thomas Shaughnessy, president of the Canadian Pacific railway, has confirmed the report of the purchase from the Elder-Dempster Steamship Co. of fourteen vessels now engaged in Atlantic trade. Concerning the purchase he said:

"We have now almost completed the negotiations which have been under way for some time that we might secure an Atlantic service of our own for both passenger and freight traffic, and all that remains to be done is to adjust a few details and then we commence to operate our own line. This purchase is merely the nucleus of the fleet we expect to possess. Among the other details which have yet to be arranged is that of remuneration by the government for the carrying of the mails, which comes within the scope of the operations of the passenger steamships. Five vessels of the fleet will be devoted to passengers and cold storage, the passenger boats being the Lake Manitoba, the Lake Champlain, the Lake Erie, the Montfort and the Montegale. The Montfort, the Montegale and the Lake Erie are equipped for cold storage, as are also the freight steamships Monterey and Montcalm, which are constructed so they can be adapted for the passenger service should such become necessary. The average speed of the vessels constituting the fleet is understood to be about 15 knots, and the tonnage ranges from about 5,500 to nearly 9,000."

The Canadian Pacific will probably continue to run the steamships from the same ports as at present—Montreal in summer and St. John and Halifax and Portland in winter—but this is subject, Sir Thomas said, to further consideration.

#### ESTIMATES FOR DEPARTMENT OF COMMERCE.

Estimates aggregating \$8,075,000 for the support of the department of commerce and labor for the remainder of the present fiscal year and the whole of the next have been submitted to congress. The estimates include also the erection of a new building for the department. Upon this score Secretary Cortelyou recommends that the building should not be inferior in convenience and beauty to the structures which commercial and financial institutions in the great centers of American trade are erecting for the transaction of their daily business. It should be designed on a scale large enough to provide for the reasonable growth for some years to come of the various branches of the public service comprising the department at the outset, and to supply quarters for such other branches of the service as by creation or transfer may hereafter be brought under its jurisdiction. It should have at least one hall suitable for conferences or congresses, international or national, which by invitation of

the government of the United States have met in this country in the past and may meet hereafter. The department contemplates having 1,300 persons in its employ by July 1.

#### MISCELLANEOUS MATTERS.

A meeting of stockholders of the ship yard will be held Mar. 12 to elect directors.

The lake-built Minnetonka is under charter to take a general cargo from New York to San Francisco in March.

Naval Constructor John G. Tawressey, who is stationed at San Francisco as government inspector of the war vessels which are being built by the Union Iron Works, has resigned.

It is reported that the Baltimore Ship Building & Dry Dock Co. and the William Skinner Ship Building & Dry Dock Co., Baltimore, Md., are negotiating to combine their interests.

The big steel ship Atlas, belonging to the Standard Oil Co., and the handiwork of Arthur Sewall & Co., Bath, Me., has just completed a fast trip from Hong Kong to the Virginia coast. The run was made in ninety days. This record has been beaten but once.

It is more than probable that the bill creating a commission to raise the laws relating to the construction and inspection of marine boilers, which was printed in the last issue of the Review, will be passed. The bill has been favorably reported from committees to both house and senate.

Bids for the completion of the dry dock at the League Island navy yard were opened a few days ago by the bureau of yards and docks, navy department, Washington, D. C. The bid of the C. M. Scofield Co., Pittsburg, to complete the dock in two years at a cost of \$1,148,500 was the lowest.

Lightship No. 71 broke away from Hatteras in last week's storm, was returned, broke away again and was found in Hampton Roads, having come in under her own steam. The new lightship No. 71, built at Petersburg, is hauled out at Norfolk for finishing touches. She will go to the coast of Maine.

Bids will be opened in the department of yards and docks, Washington, D. C., on March 14 for constructing a steel floating dry dock for the naval station, Cavite, Philippines. The dock is to be not less than 500 ft. long, 100 ft. wide and to have a lifting power of 16,000 gross tons. The appropriation available for the dock is \$1,225,000.

The knockabout Apache, owned by L. C. Wade of the Boston Yacht Club, has been sold to Mr. J. Willis Martin of Philadelphia through the agency of Frank N. Tandy. The Apache is a cruising knockabout 21 ft. on the water line, 32 ft. 3 in. over all, 7 ft. 3 in. beam and 5 ft. 5 in. draught. She is an exceptionally fine cruiser and will be used by Mr. Martin at Winter Harbor, Me.

Mr. William R. Trigg, president of the William R. Trigg Co., Richmond, Va., died last week at his home after an illness which lasted practically for a year. He was only fifty-four years old. He was instrumental in establishing the Richmond Locomotive Works, and founded a few years ago the Trigg ship yard. More than any other one man he developed the manufacturing resources of Richmond.

Senator Lewis has introduced in the senate at Albany a bill to provide for the appointment of a commission of three to inquire whether the United States will undertake the construction of a deep waterway from Lake Erie to the Hudson river. The advocates of canal improvement protest that this measure is submitted simply to confuse the issue. They declare that there is no practical hope of a ship canal through New York state.

It is reported from Pittsburg that the Jones & Laughlin Steel Co. has completed arrangements for the erection of a steel rail mill to cost \$2,000,000, and that the company will also increase its capacity for finished products by building structural mills costing \$1,000,000. The new rail mill will be a combination mill, to be operated on both rails or billets and bars, or either. Devoted exclusively to rails, its daily output will be 2,000 tons.

The naval appropriation bill, as it has passed the house of representatives, provides for three new battleships, one armored cruiser, two steel training ships and one wooden brig for training purposes. In addition the secretary of the navy was authorized to purchase submarine torpedo boats, costing not more than \$500,000, which in his discretion meet the requirements of modern submarine warfare. He is directed to conduct experiments and determine the best type of boat. The bill contains a stringent provision to prohibit hazing at the naval academy, submitting anyone found guilty of the practice to immediate expulsion.

It would seem from cable dispatches that the second trial of the British cruisers Hyacinth and Minerva, fitted with water-tube and cylindrical boilers respectively, did not result favorably for the water-tube boilers, though judgment must be reserved until the full data is obtained. According to the cable the warships left Plymouth with an equal quantity of coal for Gibraltar and the Minerva steamed twelve hours after the Hyacinth's bunkers were empty. The vessels recoaled at Gibraltar and started on the race homeward during the morning of Feb. 15, with the result that the Minerva reached Portsmouth on the morning of the 18th, having averaged 18 knots. The Hyacinth's boilers broke down in the Bay of Biscay.



## CANADA TO ESTABLISH A COLONIAL NAVY.

The St. John's, N. F., correspondent of the New York Times is authority for the statement that Canada is about to create a colonial navy, and as the first step towards this end will establish a naval militia on the Atlantic seaboard where there are thousands of men engaged in the off-shore and Grand Banks fisheries. To provide the requisite machinery for the founding of this organization the government has dispatched the British naval commander in charge of her fisheries protection squadron to this port to examine into the workings of the Newfoundland naval reserve with a view to modeling the proposed Canadian battalion upon the highly successful little brigade in the island colony.

The Newfoundland reserve is an imperial body, a branch of that trained around the coast line of the British isles. It is recruited among the young fishermen, and regulations as to enlistment, training, payment, and service are identical with those in vogue in England. There is a permanent drillship, the disarmed cruiser Calypso, stationed in St. John's, the officers of which "lick into shape" the raw material, and this is then drafted aboard regular warships for a term of sea service. A detachment of eighty men from Newfoundland is now serving aboard the cruiser Charybdis, Com. Montgomerie, flagship of the allied fleet recently blockading the Venezuelan coast, and 150 are now being trained at St. John's to join her and the battleship Ariadne at the end of October next, when they finish their summer patrol of the "French shore" of this island.

With the similarity in conditions along the Atlantic fore-shore, both in Canada and Newfoundland, the former country has naturally looked to the latter's naval force as the model for her own. The legislation to create it is to be enacted at the coming session of the Ottawa parliament, and the officer now at St. John's will formulate the details of the scheme. It will not, however, be an imperial force, like Newfoundland's, but a purely domestic organization, like Canada's militia, though it may be used for imperial defense in an emergency, as Canada enlisted her several contingents for service in South Africa during the recent Boer war.

Canada has already the nucleus of a navy in her flotilla of fishery cruisers, sixteen in all, of which twelve are stationed on the Atlantic, two on the lakes, and two on the Pacific. They are stout and serviceable steamers, armed with machine guns and the latest additions strengthened to carry quick-firers, if desired. The effective personnel is ninety-two officers and 680 men, and these are all grounded in the rudiments of drill. The twelve on the Atlantic patrol the coast line from Fundy bay to Belle Isle strait, a stretch of 5,600 miles, and enforce the fishery laws, prevent smuggling, and supply the lighthouses. Their period of service is usually from May until November, and they are, with one or two exceptions, laid up for the winter and their crews discharged. This causes many breaks in the personnel from season to season, and the idea of the naval enlistment would be to train them for this service during the winter months so that a substantial backbone will be provided permanently around which the casual force enlisted from year to year could be grouped.

There are 30,000 deep-sea fishermen in the maritime provinces, besides some 20,000 other men employed in the coast fisheries, and this makes a total considerably larger than that of the operatives in the New England fisheries. From this total it is estimated that 10,000 young men can be obtained to enlist in the naval reserve, the period of training being arranged for the winter as in Newfoundland, because much of the seaboard being then blockaded by ice fishing on a large scale is impossible, and the greater portion of the trawling fleet is laid up in the coast harbors until the spring, while the men seek other employments in the mines and the lumber camps, until the season re-opens. It has been found possible in Newfoundland to enlist hundreds of young men of the finest class of mariners for service and drill during that period, whereas during the fishing months it would be impossible to procure them without seriously dislocating the ordinary industrial conditions of the island and interfering with the successful prosecution of the cod fisheries.

The Newfoundlanders have proved to be admirable recruits, their seamanship being exceptional. Bred to their maritime pursuit from early youth, they are proficient in all sailorly arts and can handle boats and small craft with unequalled skill. They are stout oarsmen and masters of compass, logline and lead, and they have little to learn about the internal economy of sailing craft. The more intricate naval material they acquire readily and they pass about 95 per cent. of their number into the grade of "qualified seamen" after a six months' cruise. There is a total seafaring population of nearly 80,000 in the island to recruit from and the admiralty aims to put through 600 men every year which will be all that the squadron in North American waters can accommodate.

This will give a trained force of 6,000 men in ten years, and if Canada's scheme prospers to a similar extent the result will be the formation of an auxiliary to the imperial forces which will be very acceptable in the day of trial. Last year the British navy had a total effective force of 155,000, of whom 120,000 were at sea, 28,000 in the reserve and 7,000 composing the coast guard. Within five years it is calculated that this total will be swollen

to 200,000, which will be about all the naval recruiting that the British isles will stand, owing to the simultaneous need for the enlargement of the army. For this reason an overseas reserve of 5,000 or 10,000 men will be very satisfactory, more especially when composed of such approved material as the Newfoundland branch has shown itself. The prospect, indeed, is that the port of St. John's will be fortified within a few years, and converted into a naval base with a special application to the more effective safeguarding of the Atlantic grain route, which passes across the grand banks almost within sight of St. John's and is dominated from this port. At present the only naval stronghold of Great Britain hereabout is Halifax, Nova Scotia, but grain ships, whether from American ports or plying via the St. Lawrence, do not approach that place and are utterly devoid of protection or shelter when east of Cape Race, against an enemy in mid-ocean.

For this reason St. John's is being considered as a suitable site for another stronghold, because it already has a squadron of British cruisers stationed there in summer, owing to the French shore dispute, and the reservists could be more easily mustered there than elsewhere, while the natural features of the port are such that it can be made impregnable at a very small cost. The harbor is almost landlocked, inclosed within high hills crowned with batteries which command the whole sea face, and which could, with modern artillery, be rendered so effective that the port would become the refuge for all the convoys crossing the ocean. The advantageous geographical position of Newfoundland has been made more manifest latterly through the discussion about fast lines and ocean routes, and the further fact that all the ocean cables cross the grand banks and could be cut without hindrance as things now are, accentuates the need of stationing warships here and adopting adequate defenses so that an aggressive or defensive course could be taken as circumstances warranted.

The cruisers could be used to scout beyond the grand banks or sweep these waters of an enemy's shipping. The port could be utilized to fall back upon, to shelter merchantmen, or to refit war craft and recrew them from the reserve. The men of this force would be gathered there if war impended, and would be employed to partly man the batteries, and with St. John's and Halifax so provided the defense of the western ocean would be virtually assured.

The complete success of the naval reserve plan, so far as Newfoundland is concerned, is admitted by the naval experts, but they are doubtful of the Canadian experiment for a variety of reasons. Canada declined last year to share in the contributions to the imperial navy which the other colonies made, and has adopted this policy as an alternative. But the objection to this is that it is not an imperial arm and is not available for imperial purposes except when Canada pleases, whereas the imperial navy has to be always employed to defend Canada's territory or commerce if these are menaced.

That navy is obliged, by the peculiar relations between the mother country and the colonies, to defend all of them as well as her own shores. For many years past Australia has contributed to the maintenance of a special squadron in her waters for the defense thereof, but the other colonies made no such endeavor to assist Britain. Last year, during the coronation functions, Mr. Chamberlain submitted to the colonial premiers the matter of imperial naval defense, and they all undertook to provide annual subventions, Canada alone excepted. Her refusal was due to an unwillingness to become a party to all Britain's European entanglements, and she is adopting the local naval organization instead. But this is of merely negative value to the empire, because it relieves the British taxpayer of no burdens and obliges him to provide his full naval force, as at present, seeing that Canada's help may not be forthcoming when he expects it. The battalion will undoubtedly be a good one, as Canada's military force was in South Africa, but it is not subject to levy at all times.

Moreover it has no ships of its own except the fishery cruisers which are not armored and cannot be regarded as effective, judged by the standards of modern war craft. Likewise, it has no experienced men whatever, no sea drill under the actual conditions of war ship life, no familiarity with the contingencies of scouting and fighting work, and would be worthless if set to act for itself. It is contended that it could be employed to defend the St. Lawrence route, but the fallacy of this is obvious, as it could do nothing without the aid of the British navy, and the contention of the British authorities is that it should be organized as an imperial force and part of the cost of its maintenance borne by Canada as a contribution toward the war fund, the admiralty supplying ships in which to train the men, and the whole scheme being assimilated with that for imperial defense in which the other colonies are all enlisted. The isolation of Canada is the weak spot in the plan, and until she has joined the other colonies the permanence of the project cannot be assured.

The Canadian government seems to think that the alternative they are wedded to will satisfy all the obligations for which they are liable. The fact is overlooked that a formidable combination of European powers may work such disaster to England's navy that it would be unable to keep the sea, and in that case Canada's force would count for naught, whereas if included in



the regular navy at the outset of a fight it might be the means of preventing a disaster.

The British authorities assign another important reason for discouraging a special Canadian force, and it is that the men trained by Canada as proposed would mostly all drift across the border and join the American navy, just as they form the mainstay of the American fishing fleet today. The contention is that the higher pay and lighter work would be a great inducement for them to migrate to the United States and join the warships there, in the absence of any imperial obligation such as binds the Newfoundlanders to the imperial service. The only remedy for this would be to establish the battalion as an imperial auxiliary, under the same conditions as Newfoundland's, and failing in this, a disappointment, if not a failure, is predicted. The lack of a central authority is recognized by all to be a decided defect in the scheme, and it may ultimately transpire that Canada's force may be converted into an imperial corps and utilized accordingly. Meanwhile, however, the fact remains that it is to be organized as a colonial battalion, and the outcome of the experiment should not be without interest for the United States as well as Canada and Great Britain.

#### FINANCIAL STATEMENT NORTHERN NAVIGATION CO

The annual meeting of the Northern Navigation Co. of Ontario was held at Collinwood recently. The report for the year ended Dec. 31, 1902, shows that the paid-up capital stock was increased during the year from \$560,000 to \$840,000 to purchase the minority stock of the Northwest Transportation Co. and to pay for the new steamer Huronic, which was completed last spring and placed on the Sarnia-Lake Superior route. There was expended on permanent improvements and charged to current expenses \$24,849.64. Following is the financial statement:

ASSETS.	
Ten steamers .....	\$632,478.28
Buildings and plant .....	11,546.16
Merchandise and fuel .....	4,391.21
Insurance unexpired .....	6,277.77
Accounts receivable .....	25,799.83
Cash on hand .....	485.36
	<hr/>
	\$980,978.61
LIABILITIES.	
Capital stock .....	\$840,000.00
Rest account .....	90,000.00
Profit and loss .....	15,725.69
Bank of Toronto .....	29,602.39
Accounts payable .....	5,650.53
	<hr/>
	\$980,978.61
PROFIT AND LOSS ACCOUNT.	
Balance at credit, 1901 .....	\$ 12,356.11
Gross earnings of steamers .....	\$532,301.48
Total expenses .....	443,781.56
	<hr/>
Net profit .....	88,519.92
Premium on 2,786 shares at 10 per cent....	\$ 27,860.00
Premium on sale of fourteen shares.....	673.50
	<hr/>
	28,533.50
	<hr/>
	\$129,409.53
APPROPRIATIONS.	
Half-yearly dividend paid July 1, 1902, on 5,600 shares, at 5 per cent. ....	\$ 28,000.00
Half-yearly dividend paid Jan. 2, 1903, on 8,400 shares, at 5 per cent. ....	41,773.84
Directors' compensation and expenses .....	3,910.00
Transferred to rest account .....	40,000.00
Balance at credit .....	15,725.69
	<hr/>
	\$129,409.53

#### McDERMOTT'S PROPELLER COMPUTER

The screw propeller computer made by Prof. Geo. R. McDermott of the school of naval architecture, Cornell University, and which was recently described and illustrated in these columns, is fast meeting with favor. It is the size of a small book, composed of one stationary and two moveable discs carrying suitable scales, accurately engraved, and is designed for the purpose of furnishing a means, whereby the dimensions and proportions of screw propellers—diameter, pitch, surface, revolutions, slip and efficiency—can be quickly and accurately determined for any given case or set of conditions. Engineer-in-Chief Geo. W. Melville of the navy has had the computer examined and finds that it gives results with as great accuracy as the known data in such calculations will warrant. "Somewhat over a year ago," says Admiral Melville, "I directed Mr. Williams of my office to embody the results of Froude's experiments in a logarithmic chart, the curves of which were faired with great care. For testing the computer, we have, therefore, used the chart rather than the table given by Barnaby. We were at first somewhat skeptical about the computer, as it did not seem

possible to condense so many different curves into one or two arbitrary scales without introducing undesirable errors. The purely logarithmic scales of the computer we accepted as correct, after verifying the relations of exponents by comparing the scale lengths corresponding to the ratio 10. To test the arbitrary scales we selected seven widely separated points on the chart, and, working back to the screw data, compared these to the results given by the computer, all of which were tabulated." The tabular statement to which Admiral Melville refers gives results in a number of cases covering a wide range of propeller practice, showing that the computer gives values within one-half of 1 per cent. of that obtained by the use of Froude's original data.

Mr. P. C. Walter of Chas. P. Willard & Co., Chicago, builders of marine engines and boilers, steam yachts, tug boats, etc., says in a letter to the Review: "I am free to admit that some of the intricate problems of propeller practice are very much of a task with me, and my first efforts to make use of Prof McDermott's computer were not altogether successful, but an explanation from him regarding the working of the device has made several points clear to me and the results are now highly satisfactory. This recommendation is unsolicited."

#### COL. HENRY C. PROUT.

The announcement that Col. Henry Coates Prout, formerly editor-in-chief of the Railroad Gazette, has been appointed first vice-president and general manager of the Union Switch & Signal Co., was the occasion of genuine pleasure to his many friends and acquaintances, especially those associated with railroad affairs. The switch and signal apparatus manufactured by this company is used by the foremost railroads in the United States. The company was organized in 1883, with a capital of \$1,500,000, and has been engaged in the manufacture of every known form of automatic and semi-automatic railroad signals. The appointment of Col. Prout as the executive head of the company means that it has secured the best man obtainable for the post. In the fall of 1863, Col. Prout enlisted in a Massachusetts regiment. In the army of the Potomac he went through the Wilderness campaign. In 1865 he was mustered out, and two years later entered the University of Michigan, where he graduated with the degree of civil engineer. He had a few years work on railroad surveys and construction, and two summers were spent in taking surveys in the Rocky mountains. After this experience, he entered the service of the khedive of Egypt, as a major of engineers. He remained in that service about four years and a half and reached the grade of colonel in the general staff. After the first year, he went to the Soudan in command of an expedition to Kerdofan and Darfour, and thence he was sent to the head of the Nile as governor-general of the provinces of the Equator. Col. Prout's work here was largely administrative. He had 3,000 soldiers under him and was supreme over finance, civil and military affairs. After his return to America, he was for a little over a year civil engineer to the company out of which the Union Switch & Signal Co. grew. Col. Prout was in business in the city of New York for a few years, and in March, 1857, became the editor of the Railroad Gazette. As the editor of the Gazette he built an enviable reputation, well founded upon his high professional skill and his character as a man. He established a standard of editorship which will probably long continue as that journal's most valuable asset—one that will be hard indeed to live up to, much more to surpass. In recognition of Col. Prout's splendid work as an editor and journalist, Yale university last year gave him the honorary degree of master of arts.



The navy department has issued a circular defining the characteristics of the gunboats Dubuque and Paducah, bids for which are about to be called for. These vessels will be of the following dimensions: Length on load water line, 174 ft.; breadth, extreme, 35 ft.; mean draught to bottom of keel at trial displacement, 12 ft. 3 in.; mean draught, full load, about 13 ft. 5½ in.; total coal bunker capacity, about 200 tons; coal carried on trial, about 100 tons; displacement on trial, 1,080 tons. The vessels will be required to make 12 knots on trial. The hull will be composite to a point about 2 ft. 3 in. above load water line amidships, above which point it will be entirely steel. The armament will consist of six 4-in. rapid-fire guns, four 6-pounder rapid-fire guns, two 1-pounder rapid-fire guns and two Colt automatic guns. The engines will be vertical, twin-screw, triple-expansion type.

The Cleveland Punch & Shear Works has begun shipments on an order involving the supply of \$50,000 worth of tools to the Great Lakes Engineering Works, Detroit.



## NEW AND CORRECTED CHARTS.

J. D. Potter, 145 Minories, London, chart agent for the British admiralty, announces the publication of the following new charts:

- No.  
 320 North American lakes, plans added—Michipicoten harbor, Gargantua harbor.  
 3316 West Indies, Puerto Rico, south coast—Guyanilla harbor.  
 3281 England, south coast—Portsmouth harbor, mooring ground, southern sheet.  
 2175 England, south coast—Poole harbor.  
 1607 England—River Thames entrance, North Foreland to the Nore.  
 3278 Channel islands, Jersey—St. Helier harbor.  
 2361 Germany, Elbe river—Outer light-vessel to Brunsbuttelkoog (plans—Cuxhaven road, Kaiser Wilhelm canal entrance, Brunsbuttelkoog).  
 3262 Germany, Elbe river—Brunsbittelkoog to Hamburg (plans—Hamburg and Altona harbors).  
 3303 Black sea—Batum bay.  
 3288 Newfoundland—Northern arms of Canada bay.  
 3308 Newfoundland—Little river.  
 3310 Newfoundland—Bay of Islands, outer part.  
 3298 West Indies, Puerto Rico, east coast—Ensenada Honda and Puerca bay.  
 3304 South America, east coast—Rio de Janeiro to St. Sebastiao island.  
 602 British Columbia—Roche harbor and approaches.  
 3313 North America, west coast, Alaska—Yakutat (Bering) bay.  
 688 Madagascar—Tamatave.  
 3289 Red sea—Port Berenice.  
 3312 Eastern Archipelago—Madura island, south coast; Bunder road.  
 3311 Eastern Archipelago—Anchorages on the north coast of Java.  
 3314 Philippine islands, anchorages on the west coast of Luzon—San Fernando harbor; Port Santo Tomas.  
 3309 Japan, gulf of Tokvo—Uraga harbor.  
 28 England, south coast, plan added—Salcombe harbor.

The list of charts in which additions and corrections have been made is as follows:

- No.  
 853 United States, east coast—St. Andrew sound to St. John river.  
 130 Leeward islands—Anguilla to Puerto Rico with approaches to Virgin islands.  
 28 England, south coast—Salcombe river.  
 34 England, south coast—Scilly isles.  
 2390 Scotland, west coast—East and West Lochs Roag.  
 2311 Norway, sheet IX—Fleina to Vestfjord and the Lofoten islands.  
 2302 Gulf of Bothnia, sheet VII—Tome point round the head of the gulf to Tauvo.  
 2647 France, west coast—Les Sables d'Olonne to Bourgneuf.  
 1799 Central America, east coast—Boca del Drago; Boca del Toro.  
 1358 South America, east coast—Union bay to Rio Negro.  
 1544 Central America—Panama road.  
 2087 Africa, south coast—Bashee river to Umtavuna river.  
 2088 Africa, south coast—Umtavuna river to Tugela river.  
 2089 Africa, east coast—Tugela river to Delagoa bay.  
 648 Africa, east coast—Delagoa bay to river Zambesi.  
 685 Africa, east coast—Bazaruto bay.  
 1810 Africa, east coast—River Zambesi to Mozambique harbor.  
 1809 Africa, east coast—Mozambique harbor to Bas Pekawi.  
 658 Africa, east coast—Ras Pekawi to Cape Delgado.  
 1808 Africa, east coast, sheet VIII—Cape Delgado to Kilwa.  
 690 Africa, east coast—Cape Delgado to Mikindani bay.  
 662 Africa, east coast—Kilwa point to Zanzibar channel.  
 1032 Africa, east coast—Channels between Ras Tikwiri and Mafia island.  
 664 Africa, east coast—Zanzibar to Malindi.  
 640 Africa, east coast—Pangani to Ras Kimbiji, two sheets.  
 1390 Africa, east coast—Chale point to Pangani.  
 848 Africa, east coast—Malindi to Juba.  
 759A Madagascar—Cape St. Andrew to Bevato island.  
 2762 Indian ocean islands—Comoro islands.  
 40 India, west coast—Karachi harbor.  
 934 Eastern Archipelago—Surabaya, Bali and Sapudi straits, etc.  
 3019 Japan—Tsu Saki to Kagara Sima with the channels to Imari.  
 651 Japan—Bungo channel.

The new steel steamer building at the Harlan & Hollingsworth Co.'s works, Wilmington, Del., for the Eastern Steamship Co. is to be named Calvin Austin. Mr. Austin is vice-president of the steamship company.

The secretary of the treasury has asked congress to provide two new revenue cutters to take the place of the MacLean and Hamilton which have outlived their usefulness.

## SHIP BUILDING AT NEWPORT NEWS.

Newport News, Feb. 25.—Overtures have been made by property owners of this place to the W. R. Trigg Co. of Richmond with a view of having its plant removed here. The Trigg company recently failed and, believing that the parties who are interested in it would prefer to be on deep water, two men of this city offered a free site of 150 acres with a frontage on James river of 2,000 ft., about three miles above the Newport News Ship Building & Dry Dock Co.'s plant and within one mile of the main line of the Chesapeake & Ohio road. A site of 100 acres a half mile from this property recently sold for \$50,000 cash. Lewis Nixon has also been approached with a view of locating here a ship yard to turn out tugs, river steamers, yachts and launches, and in the event the Trigg company will not accept the site the same offer will probably be made to him. The two men who own the 150 acres say they will give the site free to any one who can establish responsibility and who will build a ship yard that will employ at least 1,500 men. Much interest has been excited by the offer and it is believed that it will not go unaccepted very long.

The Newport News company has just been awarded a contract for repairing the British steamship Darenty, which went aground near Hatteras and damaged her outer and inner bottoms. The repairs will cost about \$40,000. Ship yards at New York, Philadelphia and Baltimore had representatives here to make estimates. Among them was Henry Konitzky, now with the ship yard at Sparrow's Point, Md., and the first general superintendent of the Newport News works. Mr. Konitzky was succeeded in the early 90's by Sommers N. Smith, who was later succeeded by Walter A. Post, the present general superintendent.

An effort is being made by the people of Newport News to have the ship yard fix April 23 as the date for the launching of the armored cruiser West Virginia and if possible to have the Maryland, a sister ship, put overboard the same day. The military and firemen will give a carnival during the week of the 20th, and Thursday, April 23, will be the big day. Excursions will be run here from all parts of the state on that day and the people of the city are anxious to have a launching attraction in the morning in order to have the thousands of West Virginians and others who will come to see the event here on the same day. It is not believed that a double launching will be arranged, although the ship yard has made no announcement yet.

The new battleship Maine arrived in Hampton Roads last week and came up to Newport News Monday for coal. Athletic events were held aboard the monitor Puritan here on Monday. The Puritan will remain here all the week. Flags were at half mast at the navy yard last Monday in memory of Rear Admiral Wilde. The torpedo boat destroyer Truxton, on her last trial run in the Roads, made 29 knots. The torpedo boat destroyer Barry was commissioned at the navy yard several days ago. The new torpedo boat destroyer Whipple will have her speed trial March 9. It is again reported that Germany will send the cruisers Gazelle and Falke from the South Atlantic station here to be overhauled.

When the new Atlantic Transport Line steamship Massachusetts passed in the Capes and proceeded to Baltimore to load her first cargo, the Baltimore, Norfolk and other papers referred to the ship as the largest vessel that had passed in the Capes since the Great Eastern. An erroneous impression was created. The largest ships that have passed the Capes are the Pacific liners Korea and Siberia, built at Newport News. The Korea is 572 ft. 4 in. in length over all and has a displacement of 18,400 tons, with a draught when loaded of 27 ft. The dimensions of the Siberia are the same. The Massachusetts is 507 ft. over all, displaces 17,200 tons and has a draught when loaded of 27 ft. 4 in. The Massachusetts was built by the New York Ship Building Co. at Camden, N. J., and a sister, the Maine, was launched at Sparrow's Point, Md., last week.

Judge Edmond Waddill, Jr., in the United States court, has handed down a decision that fixes the next procedure in the matter of the condemnation of the Schmoele tract back of Portsmouth, which the United States government desires for additional navy yard purposes. There are 272 acres in the tract and a commission was appointed to condemn the property and fix a just compensation for the owners. The commission appraised the property and fixed its value at \$572,000. The government claimed that this was excessive and protested against a confirmation of the commissioners' report. The United States district attorney argued that a jury of twelve and not a freehold board of five should determine the value of the property and moved to set aside the finding. The court ruled that this was not sufficient ground for ignoring the commission's report, but held, after hearing evidence, that the ends of justice would best be met by a reappraisal of the property and the report of the condemnation commission was not confirmed. The next procedure will be determined later.

It has been said that the new dry dock at Hunter's Point, Cal., is the largest in America. This is an error. The new dry dock here is the largest in this country and really the largest in the world, as it has a larger water capacity than any other. The Newport News dock is nearly 100 ft. longer, considerably wider and 2 ft. deeper than the Hunter's Point dock.



## TRADE NOTES.

The Delta Hardware Co., Escanaba, Mich., announces special arrangements for supplying the vessel trade during the coming season. They are wholesale and retail dealers in general hardware and carry a complete line of marine supplies.

Abram Smith & Son, Algonac, Mich., ship builders and re-builders, have issued a calendar which is one of the most amusing that has come to this office during the year. The picture is the photo of a Kentucky wedding, the principals being colored. "Honey, does you lub your man," the minister is saying to the bride who looks large and determined enough not only to love him but to lick him also if necessary. The picture is from life.

"Tahiti, the Golden," is the title of a little booklet which the Oceanic Steamship Co. has just published. The letter press matter is by Charles Keeler and the book is printed upon deckle-edge paper, illustrated with half-tone photos which are, of course, printed upon smooth paper. The illustrations are upon brown tone-blocks which bring out the character of the photos well. The story has an illuminated cover and is nicely told indeed. It makes one long to see this paradise of the Pacific.

C. W. Farr, 120 W. Jackson boulevard, Chicago, who has been at work for a long time past on an electric sounding machine, has arrangements made for a series of tests of the machine on lake vessels during the coming season and will not try to push its sale until these trials are completed, although he is fully convinced himself that improvements in the machine since it was first brought out have made it a success. The Farr device can be clamped to the rail of any steamer. It is 20 in. high, 16 in. wide and 8 in. deep, weighing only 100 lbs. Soundings can be taken with a vessel under full headway. A lead sinker goes overboard; when it strikes bottom an electric circuit is closed; a bell rings in the machine and a hand on a dial points to the depth in fathoms. The reel can be operated with a crank or an electric motor.

The characteristic feature of the catalogues of Jenkins Bros., 71 John street, New York, known the world over on account of their steam specialties and especially their valves, is what they term "a fair offer." This announcement, prominent in their printed matter, is thus put as to valves: "If you will put a Jenkins Bros. valve on the worst place you can find, where you cannot keep other valves tight, and if it is not perfectly tight, or does not hold steam, oils, acids, water, or other fluids, longer than any other valve, you may return it, and your money will be refunded; and of their packing they say "use the Jenkins standard '96 packing on the worst joint you have and if it is not as we represent it we will refund the money." This company's 1903 catalogue is at hand. It is convenient of size—just large enough to give necessary information regarding various types of valves, not slighting, of course, their other specialties, which include packing, injectors, steam traps, discs, gaskets, gauge cocks, etc.

LIGHTHOUSE ESTABLISHMENT,  
OFFICE OF ENGINEER, NINTH LIGHTHOUSE DISTRICT,  
CUSTOM HOUSE, MILWAUKEE, WIS., FEB. 17, 1903.

## POSITIONS IN THE LIGHTHOUSE SERVICE.

Notice is hereby given that an examination will be held at this office for the purpose of perfecting an eligible list for the positions of Master, Mate, Second Mate, Engineer and Assistant Engineer on the Lighthouse Tender in this district, which includes Lake Michigan, Green Bay and tributary waters lying west of a line drawn across the Straits of Mackinac at Mackinac Point, Michigan; also for the positions of superintendents, masons, bricklayers, plasterers, carpenters and painters in the lighthouse service in this district.

One position of superintendent will require a machinist who understands the construction and repair of boilers and machinery.

The other position of superintendent will require a general knowledge of building construction, qualities of material and ability to handle working force.

Persons who wish to apply for the foregoing positions should obtain the proper blank forms of application from this office, either in person or by mail, and after filling them out return them to this office.

Applicants need not appear in person.

Thirty days from the date of this notice, all applications received will be examined, the applicants graded according to merits and a list of those eligible for appointment sent to the Lighthouse Board. J. G. WARREN, Major, Corps of Engineers U. S. A., Engineer, Ninth Light-House District, Chairman. Local Civil Service Board. d. Mar 12.

## FROM STEELTON TO MANDALAY.

"From Steelton to Mandalay" is the title of about as good a bit of bookmaking as we have had the pleasure of seeing for some time. It is issued by the Pennsylvania Steel Co. and is an account of the erection of the Gotteik viaduct in one of the Shan states of upper Burma, 460 miles from Rangoon, the nearest seaport, and 80 miles east of Mandalay on the road to Kunlon which is on the frontier of China. The structure which was built for the Burma Railways Co., Ltd., spans the Gotteik gorge, formed by the Chungzoune river. The bridge was erected by the Pennsylvania Steel Co. All the pieces of the bridge were manufactured in America and transported to Burma. The contract was let in April, 1899, the first consignment of material arrived in Rangoon in October of that year, the actual work of erection was started in December and the viaduct was practically completed on Nov. 1, 1900. The viaduct is 2,260 ft. long and consists of ten spans of 120 ft. triangulated girders, and seven spans of 60 ft. plate girders. The supports on which the girders rest and which constitute the more striking features of the viaduct, consist of steel towers. These towers are each made up of two trestles 24½ ft. wide across the top, and splaying outwards with a batter of 2½ in. in the foot; the two trestles of the tower are spaced 40 ft. apart and are connected at the top by 40-ft. plate girders and the whole is securely braced in all directions. The rails are at a height of 2,135 ft. above mean sea level and are 825 ft. above the Chungzoune stream which flows through the natural tunnel below. The height of the rails above the ground at the highest pier is 325 ft. The book is illustrated with a great variety of photographs, outlined and vignettted, and taken all the way from Steelton to Mandalay.

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## ELECTRICAL MATERIAL

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FOR SHIPS AND FORTIFICATIONS.



GENERAL PNEUMATIC TOOL CO.

The General Pneumatic Tool Co., recently incorporated, is a reorganization of the business of the Havana Bridge Works, Montour Falls, N. Y., which has been engaged for some years in the production and sale of improved pneumatic tools. The new corporation will manufacture pneumatic tools, compression riveting machines, pneumatic motor hoists, air compressors, and cranes, etc. Extensive improvements in the manufacturing plant have already been made and an additional building will be erected for a store and engine house early in the spring. A portion of the new equipment of machinery is already in operation but there is yet to be purchased screw machines, turret lathes, shaper, universal grinder, gear cutter, milling machine and engine lathes. The company's tools have received a very gratifying recognition and orders for compression riveting machines, pneumatic hammers and pneumatic motor hoists covering its capacity for several months are already booked. Several new types of compression riveting machines have recently been brought out in addition to those which have been on sale for several years. The company says that when all its tools are ready for the market they will constitute one of the most complete lines of pneumatic machinery ever handled by any concern in the business.

Senator Hanna's efforts to put the shipping bill, as it passed the senate last year, through the house at this session has ended in failure. The committee on merchant marine of the house has refused to return it to that body, even with an adverse report. In other words it remains in committee to die. Senator Hanna must have believed that he could have passed the bill in the

house, otherwise he would never have made the attempt. This disposes of the shipping bill as far as the present measure is concerned. It will be necessary now to go all over the ground again in the senate. There was considerable opposition to the senate bill, the Merchants' Association of New York in particular making an emphatic protest.

Vessels classed and rated by the American Bureau of Shipping in the Record of American and Foreign Shipping recently are: American screw steamer Henry Wilson, American screw steamer M. F. Plant, American screw steamer Massachusetts, British screw steamer Venture, American three-masted schooner Twilight, American three-masted schooner E. H. Weaver, American three-masted schooner Stephen G. Loud, American schooner Hope Sherwood, American schooner Robert Graham Dun, American barge Emilie, American barge Florrie, American barge Gwennie.

It appears the government is again desirous of marking the dreaded Diamond shoal, Cape Hatteras, with a lighthouse. Two attempts to build a lighthouse upon these sands have failed and the shoal is now marked with a lightship. A bill has just been reported favorably to the house to appropriate \$590,000 for a lighthouse.

Tug for Sale.

Tug Maurice W. for sale. Practically new; 48 ft. over all, 12 ft. beam, 5½ ft. draught. Engine, boiler and wheel of Sutton Bros. make. Engine 10x12; 100 lbs. steam; 50 in. wheel. Cheap for cash. Address L. E. Welch, Mackinaw City, Mich. t. f.

Engine for Sale

For Sale.—Fore and aft compound engine, 9 and 12x16 in.; Sutton build. Dean pump to match. Been run two months. Address William Tallman, 262 West Third St., Erie, Pa. Feb. 26.

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Italian Royal Navy	- - - - -	13,500 "
Chilian Navy	- - - - -	26,500 "
Argentine Navy	- - - - -	13,000 "
The "Messageries Maritimes" Company	- - - - -	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	- - - - -	18,500 "
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**WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.**

**TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.**



## ITEMS OF GENERAL INTEREST.

It is reported that the Canadian Pacific Railroad Co. has acquired the Atlantic fleet of the Elder-Dempster Steamship Co.

The submarine torpedo boat Grampus, built by the Union Iron Works, San Francisco, is to undergo a submarine test in a few days.

The oil tank steamship Narragansett, the largest vessel of her kind in the world, was launched at Greenock last week for the Anglo-American Oil Co. She can carry 11,000 tons of oil in her tanks.

The steam yacht Noma, built by the Burlee Dry Dock Co., Port Richmond, Staten Island, for William B. Leeds, the president of the Chicago & Rock Island railroad, underwent her trial trip last week and attained a speed of 20½ knots in a heavy sea.

The New Jersey Pneumatic Crane Co. has been incorporated in New Jersey with a capital stock of \$100,000. The incorpora-

tors are Louis B. Dailey, Paul Tissen and J. M. Mitchell. It is understood that the company has ample financial backing and intends to engage generally in the manufacture of pneumatic tools and air compressors of every description.

At the recent meeting of the Canadian Society of Civil Engineers Mr. A. W. Robinson of Montreal read a paper upon the hydraulic dredge King Edward VII, which has a capacity for discharging 500 cu. yds. per hour through a pipe 1,500 ft. long. Mr. E. G. M. Cape read a paper upon the "Industries of the Consolidated Lake Superior Co.," being a description of the pulp and alkali works.

Bids for supplying 5,666 tons of Krupp armor for the battleships Louisiana and Connecticut were opened by the navy department last week. The Carnegie Steel Co. and the Bethlehem Steel Co. were the only bidders, agreeing to supply the armor at from \$400 to \$420 per ton. The total of the bids was \$2,333,640. The contract will be divided equally between the two companies.

The following steamers of the Oceanic Steamship Co.'s fleet are to be equipped with the hydro-carbon system (fuel economy) which was described in a recent issue of the Review, and which is being applied to vessels of the lakes by the Great Lakes Engineering Works of Detroit: Sierra, 6,200 tons; Sonoma, 6,200 tons; Ventura, 6,200 tons; Alameda, 3,200 tons; Mariposa, 3,200 tons; Australia, 3,000 tons. Orders to equip these vessels resulted from the showing made on the steamer Zealandia of the same fleet after equipment with the hydro-carbon system.

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PITTSBURGH, - PA.

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for building crib breakwater at Manitowoc Harbor, Wis., will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Information furnished on application. J. G. WARREN, Major, Engineers. Feb. 26

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for furnishing Oregon fir timber and plank will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. J. G. WARREN, Major, Engineers. Feb. 26

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for building crib piers at Sheboygan Harbor, Wis., will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Information furnished on application. J. G. WARREN, Major, Engineers. Feb. 26

Treasury Department, U. S. Life-Saving Service, Washington, D. C., Feb. 17, 1903. Sealed proposals will be received at this office until 2 o'clock, p. m., of Friday, Mar. 6, 1903, and then publicly opened, for the construction of a life-saving station and wharf at Racine, Wis. Specifications and drawings, forms of proposals, etc., can be obtained upon application to the Superintendent of Construction of Life-Saving Stations, 17 State street, New York City; to the Assistant Inspector, 12th Life-Saving District, Room 543 Rand-McNally Building, Chicago, Ill.; or to this office. S. I. KIMBALL, General Supt. Feb. 26

Sealed proposals will be received at the office of the Light House Engineer, Buffalo, N. Y., until 12 o'clock m., of Thursday, Mar. 5, 1903, and then opened, for furnishing the materials and labor necessary for the construction of a keeper's dwelling at South Buffalo light station, N. Y., in accordance with specifications, copies of which, with blank proposals and other information, may be had upon application to Major T. W. SYMONS, U. S. A., Engineer. Feb. 26

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for building crib piers, crib breakwater, pile revetment, removal of portion of old pier, and dredging at Waukegan Harbor, Ill., will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. J. G. WARREN, Major, Engineers. Feb. 26

U. S. Engineer Office, Grand Rapids, Mich., Feb. 2, 1903. Sealed proposals for repair of piers at Pentwater and White Lake, Mich., and repair of piers and revetment at Charlevoix, Mich., will be received here until 3 p. m., March 4, 1903, and then publicly opened. Information furnished on application. CHARLES KELLER, Capt., Engrs. Feb. 26

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for dredging and rock removal at Sturgeon Bay and Lake Michigan Ship Canal, Wis., will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Specifications and all available information will be furnished on application to this office. J. G. WARREN, Major, Engineers. Feb. 26

U. S. Engineer Office, Duluth, Minn., Feb. 6, 1903. Sealed proposals for dredging about 40,000 cu. yds. at Ashland, Wis., and Ontonagon, Mich., will be received here until 10 a. m., Mar. 9, 1903, and then publicly opened. Information on application. D. D. GAILLARD, Capt., Engrs. Mar 5

U. S. Engineer Office, 57 Park st., Grand Rapids, Mich., Feb. 9, 1903. Sealed proposals for dredging harbors on east shore of Lake Michigan will be received here until 3 p. m., Mar. 11, 1903, and then publicly opened. Information furnished on application. CHAS. KELLER, Capt., Engrs. Mar. 5

U. S. Engineer Office, Duluth, Minn., Feb. 7, 1903. Sealed proposals for building in place the concrete south pier at Superior Entry, Wis., will be received here until noon, Mar. 9, 1903, and then publicly opened. Information on application. D. D. GAILLARD, Capt., Engrs. Mar. 5

U. S. Engineer Office, Buffalo, N. Y., Feb. 3, 1903. Sealed proposals for pier extension at Little Sodus Bay, N. Y., and breakwater extension at Cape Vincent, N. Y., will be received here until 11 a. m., Mar. 5, 1903, and then opened; information furnished on application. T. W. SYMONS, Major, Engrs. Mar. 5

U. S. ENGINEER OFFICE, Galveston, Tex., Feb. 23, 1903. Sealed bids, in triplicate, for improving Aransas Pass, Tex., by removing part of old jetty, will be received until 2 p. m., Mar. 25, 1903, and then publicly opened. For information apply to C. S. RICKE, Capt., Engrs. Mar. 19

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 AMERICAN PRACTICAL NAVIGATOR—Nathaniel Bowditch. \$2.25.  
 DATA BOOK—Naval architects and engineers' data book. By T. H. Watson. A reliable and simple means of recording valuable data, etc., of vessels and engines. Size of book, 8½ in. by 5 in., cloth, \$2.  
 ELEMENTARY STEAMSHIP—by Barker. New and enlarged edition. \$2.50.  
 ELEMENTS OF NAVIGATION—Henderson. \$1.  
 HAND BOOK OF ADMIRALTY LAW—Robt. M. Hughes. \$3.75.  
 HINTS ON LEGAL DUTIES OF SHIPMASTERS—B. W. Ginsburg. \$1.75.  
 ILLUSTRATED NAUTICAL ENCYCLOPEDIA—Howard Patterson. \$3.  
 INTERNATIONAL SIGNAL CODE—Bureau of Navigation. New Edition. \$3.00.  
 KNOW YOUR OWN SHIP—Thos. Walton. \$2.50.  
 MANUAL OF ALGEBRA—R. C. Buck. For the use, more especially, of young sailors and officers in the merchant navy; numerous examples and exercises. \$1.50.  
 MARINE INSURANCE. W. Gow. \$1.50.  
 MARINER'S COMPASS IN AN IRON SHIP: How to keep it efficient and use it intelligently. J. W. Dixon. \$1.  
 MODEL ENGINES AND SMALL BOATS—N. M. Hopkins. New methods of engine and boiler making; ship design and construction; fifty illustrations. \$1.25.  
 MODERN SEAMANSHIP—Lieut. Com. Austin M. Knight, U. S. N. Adopted as the text book of the United States Naval Academy. \$6.

MODERN PRACTICE OF SHIP BUILDING IN IRON AND STEEL—Samuel J. P. Thearle. 2 volumes. Second edition, revised and enlarged. \$5.25.  
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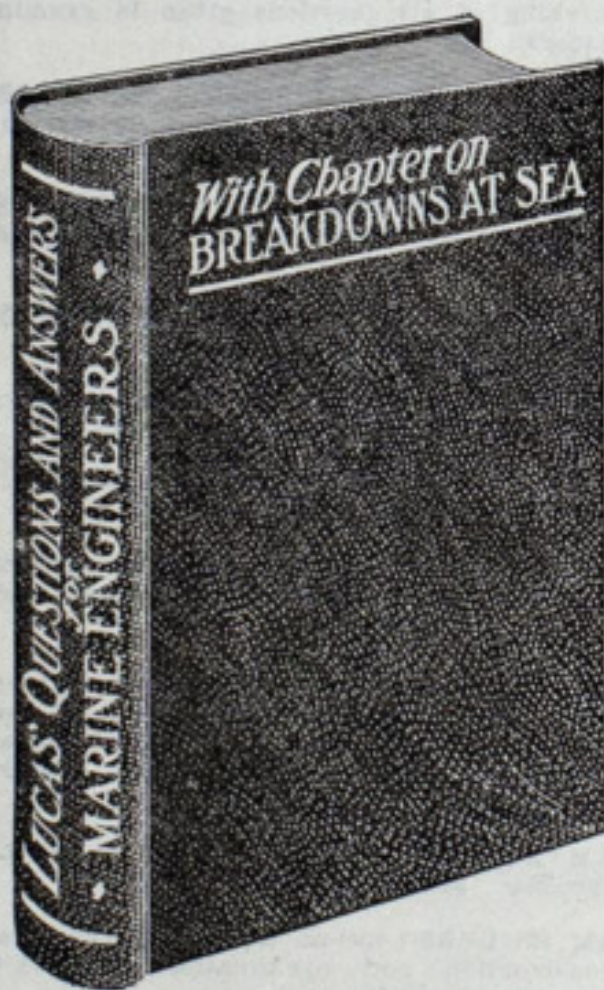
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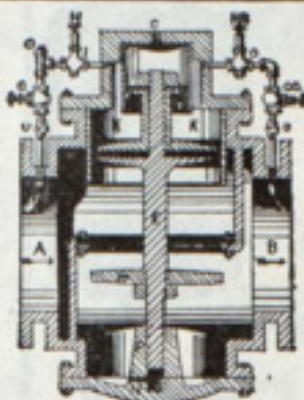
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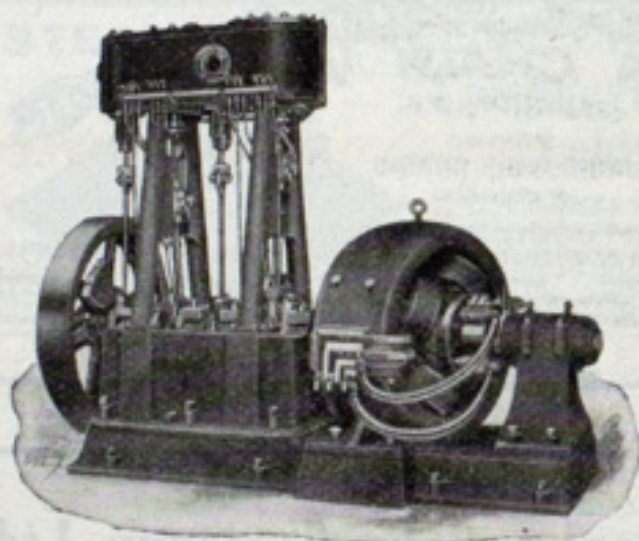
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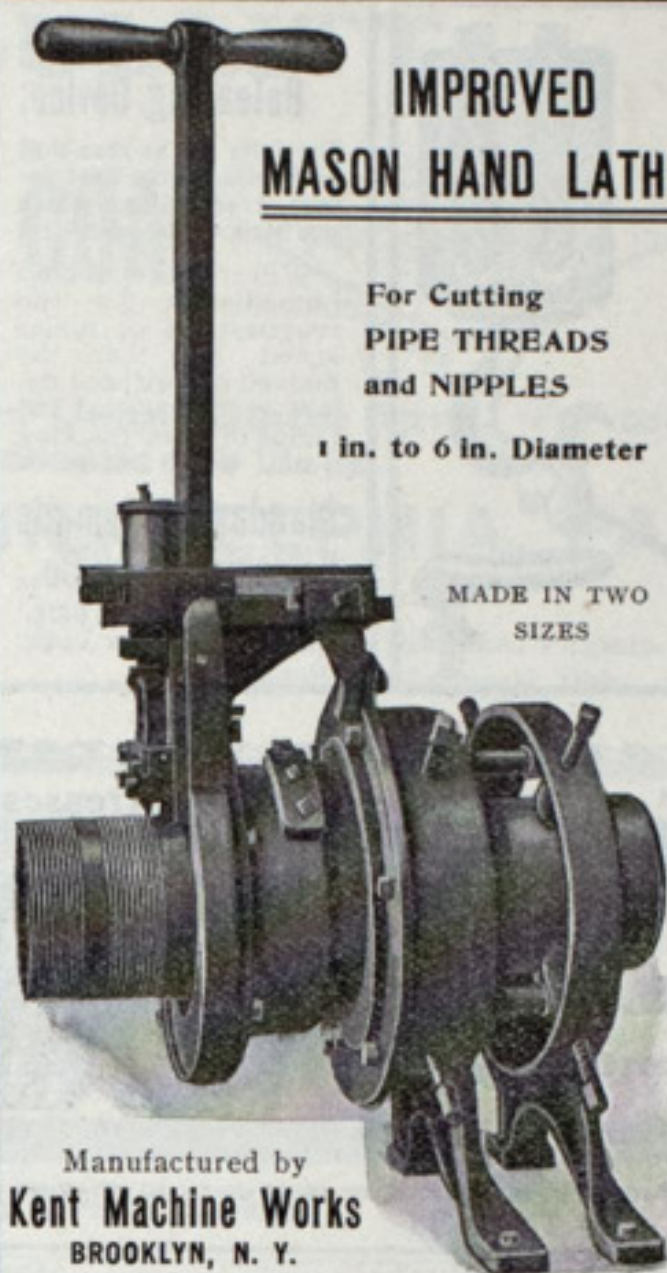
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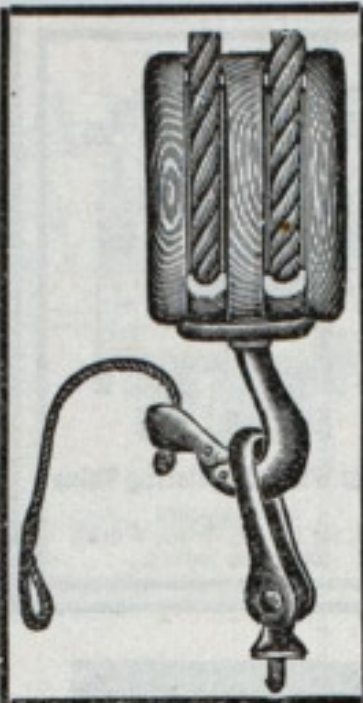


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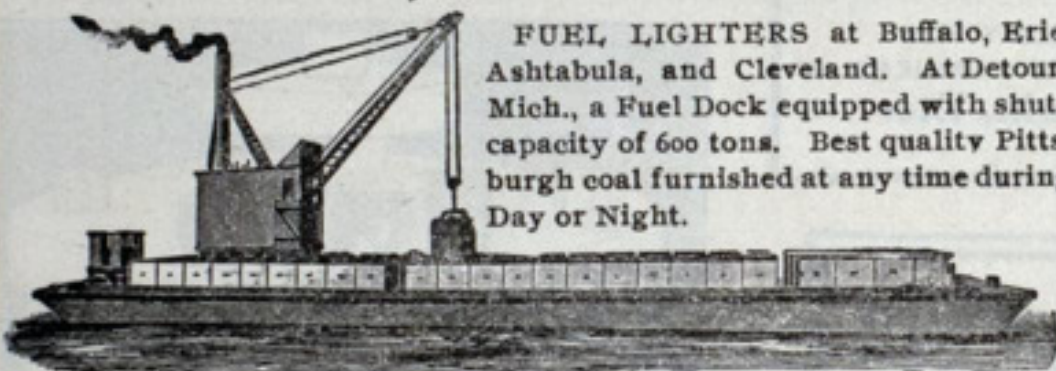
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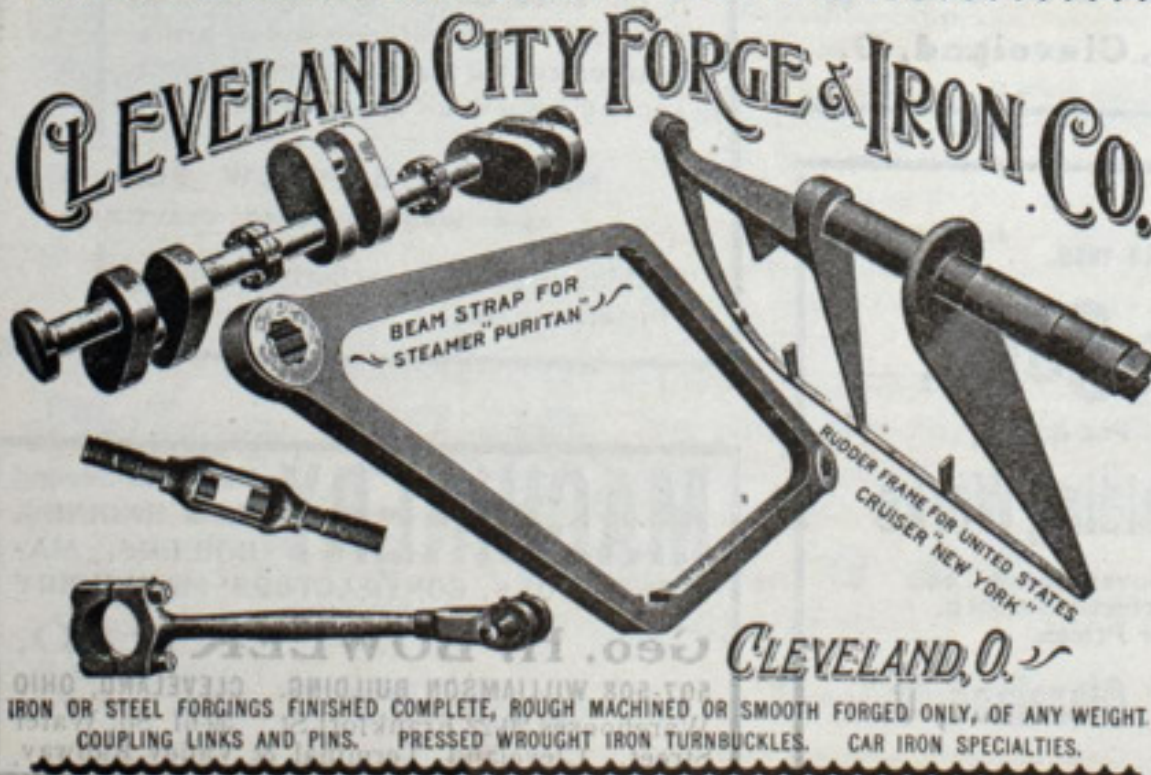
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Dake Engine Co. .... Grand Haven, Mich.  
Detroit Ship Building Co. .... Detroit.  
Fletcher, W. & A. Co. .... Hoboken, N. J.  
Fore River Ship & Engine Co. .... Quincy, Mass.  
Great Lakes Engineering Works. .... Detroit, Mich.  
Hall Bros. .... Philadelphia.  
Harlan & Hollingsworth Co. .... Wilmington, Del.  
Jenks Ship Building Co. .... Port Huron, Mich.  
Lockwood Mfg. Co. .... East Boston, Mass.  
MacKinnon Mfg. Co. .... Bay City, Mich.  
Maryland Steel Co. .... Sparrow's Point, Md.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Moran Bros. Co. .... Seattle, Wash.  
Mosher, Chas. D. .... New York.  
Neafie & Levy Ship & Engine Bldg. Co. .... Philadelphia.  
Newport News Ship Building Co. .... Newport News, Va.  
Nixon, Lewis. .... Elizabeth, N. J.  
Pusey & Jones Co. .... Wilmington, Del.  
Risdon Iron Works. .... San Francisco.  
Roach's Ship Yard. .... Chester, Pa.  
Thropp, J. E. & Sons Co. .... Trenton, N. J.  
Sheriffs Mfg. Co. .... Milwaukee.  
Superior Ship Building Co. .... Superior, Wis.  
Trigg, Wm. R. Co. .... Richmond, Va.  
Trout, H. G. .... Buffalo.  
Warrington Iron Works. .... Chicago.  
Willard, Chas. P. & Co. .... Chicago.



## BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

**ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.**  
Cory, Chas. & Son .....New York.  
Electro-Dynamic Co. ....Philadelphia.  
MacLean Hydraulic Signal Co. ....Chicago.  
Seidler-Miner Electric Co. ....Detroit.

**ENGINEERING BOOKS.**

Audel & Co., Theo. ....New York.  
Marine Review Pub. Co. ....Cleveland.

**ENGINEERING SPECIALTIES AND SUPPLIES.**  
Crane Co. ....Chicago.  
Farnan Brass Works .....Cleveland.  
Kieley & Mueller .....New York.  
McCutcheon, C. H. ....Buffalo.  
New York Belting & Packing Co. ....New York.  
Relly Repair & Supply Co., James. ....New York.

**ENGINEERS, MARINE, MECHANICAL, CONSULTING.**

Electro-Dynamic Co. ....Philadelphia.  
Garrett-Cromwell Engineering Co. ....Cleveland.  
Gaskin, Edward .....Buffalo.  
Goodenough, Walter .....New York.  
Hunt, Robt. W. & Co. ....Chicago.  
Kidd, Joseph .....Duluth, Minn.  
Logan, Robert .....Cleveland.  
Mosher, Chas. D. ....New York.  
Newman, R. L. ....New York.  
Pittsburg Testing Laboratory, Ltd. ....Pittsburg.  
Powell, Ambrose V. ....Chicago.  
Roelker, H. B. ....New York.  
Sadler, Perkins & Field. ....New York.  
See, Horace .....New York.  
Wood, W. J. ....Chicago.

**EVAPORATING AND DISTILLING APPARATUS.**  
Relly Repair & Supply Co., James. ....New York.

**FANS FOR VENTILATION, EXHAUST, ETC.**

Buffalo Forge Co. ....Buffalo.  
Sturtevant, B. F. Co. ....Boston.

**FEED WATER PURIFIERS AND HEATERS.**

Learmonth, Robert .....Buffalo.  
Relly Repair & Supply Co., James. ....New York.  
Ross Valve Co. ....Troy, N. Y.

**FIXTURES FOR LAMPS, OIL AND ELECTRIC.**  
General Electric Co. ....Schenectady, N. Y.  
Seidler-Miner Electric Co. ....Detroit.  
Westinghouse Electric & Mfg. Co. ....Pittsburg, Pa.

**FORGES.**

Buffalo Forge Co. ....Buffalo.  
Sturtevant, B. F. Co. ....Boston.

**FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.**

Cleveland City Forge & Iron Co. ....Cleveland.  
Fore River Ship & Engine Co. ....Quincy, Mass.  
Macbeth Iron Co. ....Cleveland.

**FLUE WELDING.**

Fir's, S. Sons .....Cleveland.

**FURNACES FOR BOILERS.**

Continental Iron Works. ....New York.

**FUELING COMPANIES AND COAL DEALERS.**

Castner, Curran & Bullitt (Pocahontas) ....Phila.  
Graham Coal & Coke Co., Ltd. ....Detroit.  
Hanna, M. A. & Co. ....Cleveland.  
Pickands, Mather & Co. ....Cleveland.  
Pittsburg Coal Co. ....Cleveland.  
Rochester & Pittsburg Coal & Iron Co. ....Buffalo.  
Smith, Stanley B. & Co. ....Detroit.  
Youghiogheny & Lehigh Valley Coal Co. ....Chicago.

**GASKETS, RUBBER.**

New York Belting & Packing Co. ....New York.

**GAS BUOYS.**

Safety Car Heating & Lighting Co. ....New York.

**GAS AND GASOLINE ENGINES.**

Chase Machine Co. ....Cleveland.

**GAGES, STEAM AND VACUUM.**

American Steam Gauge Co. ....Boston.  
Ashton Valve Co. ....Boston.

**GRAPHITE.**

Dixon Crucible Co., Joseph .....Jersey City, N. J.

**HAMMERS, STEAM.**

Bell Engineering Works, David .....Buffalo.  
Chase Machine Co. ....Cleveland.  
Railway Appliances Co. ....Chicago.

**HARDWARE, SHIP.**

Topky Brothers .....Ashtabula, O.

**HATCH GEARS.**

"Long-Arm" System Co. ....Cleveland.

**HEATING APPARATUS.**

Buffalo Forge Co. ....Buffalo.  
Sturtevant, B. F. Co. ....Boston.

**HOISTS FOR CARGO, ETC.**

American Ship Building Co. ....Cleveland.  
Brown Hoisting Machinery Co., Inc. ....Cleveland.  
Chase Machine Co. ....Cleveland.  
Elwell-Parker Electric Co. ....Cleveland.  
General Electric Co. ....New York.  
Hyde Windlass Co. ....Bath, Me.  
Lidgerwood Mfg. Co. ....New York.  
Marine Iron Co. ....Bay City.  
Westinghouse Electric & Mfg. Co. ....Pittsburg, Pa.

**HOLLOW STAYBOLT IRON.**

Falls Hollow Staybolt Co. ....Cuyahoga Falls, O.

**HOSE FITTINGS.**

Farnan Brass Works .....Cleveland.

**HOSE, RUBBER.**

New York Belting & Packing Co. ....New York.

**HYDRAULIC MACHINERY.**

Watson-Stillman Co., The. ....New York.  
Wood & Co., R. D. ....Philadelphia.

**ICE MACHINERY.**

American Linde Refrigerating Co. ....New York.  
Roelker, H. B. ....New York.

**INDICATORS FOR STEAM ENGINES.**

American Steam Gauge Co. ....Boston.  
Ashton Valve Co. ....Boston.

**INJECTORS.**

American Injector Co. ....Detroit.  
Crane Co. ....Chicago.  
Jenkins Bros. ....New York.  
Lunkenheimer Co. ....Cincinnati.  
Penberthy Injector Co. ....Detroit, Mich.

**INSURANCE, MARINE.**

Brown & Co. ....Buffalo.  
Brown, W. W. ....Cleveland.  
Dunham, R. J. ....Chicago.  
Elphicke, C. W. & Co. ....Chicago.  
Hawgood & Co., W. A. ....Cleveland.  
Helm & Co., D. T. ....Duluth.  
Hutchinson & Co. ....Cleveland.  
Insurance Co. of North America. ....Philadelphia.  
McCarthy, T. R. ....Montreal.  
McCurdy, Geo. L. ....Chicago.  
Mitchell & Co. ....Cleveland.  
Peck, Chas. E. & W. F. ....New York and Chicago.  
Richardson, W. C. ....Cleveland.  
Sullivan, D. & Co. ....Chicago.  
Weeks, F. H. ....New York.

**IRON ORE AND PIG IRON.**

Bourne-Fuller Co. ....Cleveland.  
Hanna, M. A. & Co. ....Cleveland.  
Pickands, Mather & Co. ....Cleveland.

**LATHE, FOR CUTTING PIPE THREADS.**

Kent Machine Works .....Brooklyn, N. Y.

**LAUNCHES—STEAM, NAPHTHA, ELECTRIC.**

Marine Construction & D. D. Co. ....  
.....Mariner's Harbor, S. I., N. Y.  
Warrington Iron Works .....Chicago.  
Willard, Chas. P. ....Chicago.

**LIFE PRESERVERS, LIFE BOATS, BUOYS.**

Armstrong Cork Co. ....Pittsburg.  
Drein, Thos. & Son .....Wilmington, Del.  
Kahnweiler's Sons, D. ....New York.  
Lane & DeGroot .....Long Island City, N. Y.  
Marine Construction & Dry Dock Co. ....  
.....Mariner's Harbor, S. I., N. Y.

**LIGHTS, SIDE AND SIGNAL.**

Helvig, H. A. J. ....New York.  
Russell & Watson .....Buffalo.

**LOGS.**

Walker & Sons, Thomas .....Birmingham, Eng.  
Nicholson Ship Log Co. ....Cleveland.  
Also Ship Chandlers.

**MACHINISTS.**

Chase Machine Co. ....Cleveland.  
Macbeth Iron Co. ....Cleveland.  
Union Machine & Boiler Co. ....Cleveland.  
Ward Machine Co. ....Cleveland.

**MACHINE TOOLS (WOOD WORKING).**

Atlantic Works, Inc. ....Philadelphia.

**MACHINERY, NEW AND SECOND HAND.**

Bowler & Co. Geo. H. ....Cleveland.  
Clyde Machine Works .....Chicago.

**MAN-HOLES, SWING DOORS, ETC.**

"Long-Arm" System Co. ....Cleveland.

**MARINE RAILWAYS, BUILDERS OF**

Crandall & Son, H. I. ....East Boston, Mass.

**MATTRESSES, CUSHIONS, BEDDING.**

Fogg, M. W. ....New York.

**MECHANICAL DRAFT FOR BOILERS.**

American Ship Building Co. ....Cleveland.  
Bloomsburg & Co., H. ....Baltimore, Md.  
Buffalo Forge Co. ....Buffalo.  
Detroit Ship Building Co. ....Detroit.  
Sturtevant, B. F. Co. ....Boston.

**METALLIC PACKING.**

Allen, Joseph .....Collingswood, N. J.  
American Metallic Packing Co. ....Cleveland.  
Hayden Mfg. Co., N. L. ....Columbus, O.  
Katzenstein, L. & Co. ....New York.  
U. S. Metallic Packing Co. ....Philadelphia.

**METAL POLISH.**

Bertram's Oil Polish Co. ....Boston.

**MOTORS, GENERATORS—ELECTRIC.**

Buffalo Forge Co. ....Buffalo.  
Electro-Dynamic Co. ....Philadelphia.  
Elwell-Parker Electric Co. ....Cleveland.  
General Electric Co. ....Schenectady, N. Y.  
"Long-Arm" System Co. ....Cleveland.  
Seidler-Miner Electric Co. ....Detroit.  
Sturtevant, B. F. Co. ....Boston.  
United Marine Mfg. & Supply Co. ....New York.  
Westinghouse Electric & Mfg. Co. ....Pittsburg, Pa.

**NAUTICAL INSTRUMENTS.**

Bliss, John & Co. ....New York.  
Ritchie, E. S. & Sons .....Brookline, Mass.

**NAVAL ARCHITECTS.**

Gaskin, Edward .....Buffalo.  
Goodenough, Walter .....New York.  
Kidd, Joseph .....Duluth, Minn.  
Logan, Robert .....Cleveland.  
Mosher, Chas. D. ....New York.  
Newman, R. L. ....New York.  
Sadler, Perkins & Field. ....New York.  
See, Horace .....New York.  
Wood, W. J. ....Chicago.

**OAKUM.**

DeGrauw, Aymar & Co. ....New York.  
Stratford Oakum Co. ....Jersey City, N. J.

**OILS AND LUBRICANTS.**

Dixon Crucible Co., Joseph .....Jersey City, N. J.  
Standard Oil Co. ....Cleveland.

**OIL FILTERS.**

Haines Co., W. S. ....Philadelphia.

**PACKING.**

Allen, Joseph .....Collingswood, N. J.  
American Metallic Packing Co. ....Cleveland.  
American Steam Packing Co. ....Boston.  
Crane Co. ....Chicago.  
Hayden Mfg. Co., N. L. ....Columbus, O.  
Jenkins Bros. ....New York.  
Katzenstein, L. & Co. ....New York.  
New York Belting & Packing Co. ....New York.  
United States Metallic Packing Co. ....Philadelphia.

**PAINTS.**

Baker, Howard H. & Co. ....Buffalo.  
Berry Bros., Ltd. ....Detroit.  
Day's Varnish & Dryer Co. ....Cleveland.  
Mohawk Paint & Chemical Co. ....New York.  
New Jersey Zinc Co. ....New York.  
Topky Brothers .....Ashtabula, O.  
Upson-Walton Co. ....Cleveland.

**PATENT ATTORNEYS.**

Thurston & Bates .....Cleveland.

**PATTERN SHOP MACHINERY.**

Atlantic Works, Inc. ....Philadelphia.

**PIPE—BRASS AND COPPER, IRON PIPE SIZE.**

Waterbury Brass Co. ....New York.

**PIPE, WROUGHT IRON.**

Bourne-Fuller Co. ....Cleveland.  
Crane Co. ....Chicago.  
Macbeth Iron Co. ....Cleveland.

**PLANING MILL MACHINERY.**

Atlantic Works, Inc. ....Philadelphia.

**PLATE BENDING AND PLANING MACHINES.**

Wood & Co., R. D. ....Philadelphia.

**PLUMBING, MARINE.**

Mott, J. L., Iron Works .....New York.  
Relly Repair & Supply Co., James. ....New York.  
Sands, Alfred B. & Son .....New York.

**PNEUMATIC TOOLS.**

Allen, John F. ....New York.  
Chicago Pneumatic Tool Co. ....Chicago.  
Railway Appliances Co. ....Chicago.

**POLISH FOR METALS.**

Bertram's Oil Polish Co. ....Boston.

**POWER DOORS AND HATCHES.**

"Long-Arm" System Co. ....Cleveland.

**PRESSURE REGULATORS.**

Kieley & Mueller .....New York.  
Ross Valve Co. ....Troy, N. Y.



## BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

## PROPELLER WHEELS.

American Ship Building Co. ....Cleveland  
 Atlantic Works .....East Boston, Mass.  
 Baltimore Ship Building & Dry Dock Co. ....Baltimore.  
 Bath Iron Works, Ltd. ....Bath, Me.  
 Cramp, Wm. & Sons.....Philadelphia.  
 Detroit Ship Building Co. ....Detroit.  
 Fore River Ship & Engine Co. ....Quincy, Mass.  
 Great Lakes Engineering Works.....Detroit.  
 Hyde Windlass Co. ....Bath, Me.  
 Harlan & Hollingsworth Co.....Wilmington, Del.  
 Jenks Ship Building Co. ....Port Huron, Mich.  
 Lockwood Mfg. Co. ....East Boston, Mass.  
 Macbeth Iron Co. ....Cleveland.  
 MacKinnon Mfg. Co. ....Bay City, Mich.  
 Maryland Steel Co. ....Sparrow's Point, Md.  
 Milwaukee Dry Dock Co. ....Milwaukee.  
 Moran Bros. Co. ....Seattle, Wash.  
 Neafie & Levy Ship & Engine Bldg. Co.....Phila.  
 Newport News Ship Bldg. Co.....Newport News, Va.  
 Nixon, Lewis .....Elizabeth, N. J.  
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.  
 Pusey & Jones Co. ....Wilmington, Del.  
 Risdon Iron Works .....San Francisco.  
 Roelker, H. B. ....New York.  
 Sheriffs Mfg. Co. ....Milwaukee.  
 Superior Ship Building Co.....Superior, Wis.  
 Thropp & Sons Co., J. R. ....Trenton, N. J.  
 Trigg, Wm. R. Co. ....Richmond, Va.  
 Trout, H. G. ....Buffalo.

## PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co. ....Cleveland.  
 General Electric Co. ....Schenectady, N. Y.  
 Seldier-Miner Electric Co. ....Detroit.  
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

## PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co. ....New York.  
 Clyde Machine Works.....Chicago.  
 Great Lakes Engineering Works.....Detroit.  
 Kingsford Foundry & Machine Wks. Oswego, N. Y.  
 Long Arm System Co. ....Cleveland.

## PUNCHES, RIVETERS, SHEARS.

Chicago Pneumatic Tool Co. ....Chicago.

## REFRIGERATING APPARATUS.

Roelker, H. B. ....New York.

## REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland.  
 Record of American & Foreign Shipping.....New York.

## RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. ....New York.

## RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. ....Cleveland.

## RANGES.

Russell & Watson .....Buffalo.

## RIVETS—BRASS AND COPPER.

Waterbury Brass Co.....New York.

## RUBBER INSULATED WIRES.

Roebbing's Sons, Jno. A. ....New York and Cleveland.

## SAFETY VALVES.

American Steam Gauge Co. ....Boston.  
 Ashton Valve Co. ....Boston.  
 Hayden Mfg. Co., N. L. ....Columbus, O.  
 Lunkenheimer Co. ....Cincinnati.

## SAIL MAKERS.

Baker, Howard H. & Co. ....Buffalo.  
 Upson-Walton Co. ....Cleveland.  
 Wilson & Silsby .....Boston.

## SALVAGE COMPANIES.

See Wrecking Companies.

## SCHOOLS—NAUTICAL, ENGINEERING.

Chicago Nautical School .....Chicago.

## SEARCH LIGHTS.

Elwell-Parker Electric Co. ....Cleveland.  
 General Electric Co. ....Schenectady, N. Y.  
 Seldier-Miner Electric Co. ....Detroit.  
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

## SHEARS.

See Punches, Rivets, and Shears.

## SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. ....Cleveland.

## SHIP BUILDERS.

American Ship Building Co. ....Cleveland.  
 Atlantic Works .....East Boston, Mass.  
 Baltimore Ship Building & Dry Dock Co. ....Baltimore.  
 Bath Iron Works, Ltd.....Bath, Me.  
 Bell Engineering Works, David .....Buffalo.  
 Buffalo Dry Dock Co. ....Buffalo.  
 Cramp, Wm. & Sons.....Philadelphia.

Craig Ship Building Co. ....Toledo, O.  
 Chicago Ship Building Co.....Chicago.  
 Detroit Ship Building Co. ....Detroit.  
 Fore River Ship & Engine Co. ....Quincy, Mass.  
 Great Lakes Engineering Works.....Detroit.  
 Harlan & Hollingsworth Co.....Wilmington, Del.  
 Jenks Ship Building Co. ....Port Huron, Mich.  
 Lockwood Mfg. Co.....East Boston, Mass.  
 Manitowoc Dry Dock Co.....Manitowoc, Wis.  
 Marine Construction & Dry Dock Co.....  
 .....Mariner's Harbor, S. I., N. Y.  
 Maryland Steel Co .....Sparrow's Point, Md.  
 Milwaukee Dry Dock Co.....Milwaukee.  
 Moran Bros. Co. ....Seattle, Wash.  
 Neafie & Levy Ship & Engine Bldg. Co.....Phila.  
 Newport News Ship Bldg. Co.....Newport News, Va.  
 Nixon, Lewis .....Elizabeth, N. J.  
 Pusey & Jones Co. ....Wilmington, Del.  
 Risdon Iron Works .....San Francisco.  
 Roach's Ship Yard .....Chester, Pa.  
 Smith & Son, Abram .....Algonac, Mich.  
 Trigg, Wm. R. Co. ....Richmond, Va.  
 Warrington Iron Works .....Chicago.  
 Willard, Chas. P. & Co. ....Chicago.

## SHIP CHANDLERS.

Baker, Howard H. & Co. ....Buffalo.  
 Moran Bros. Co. ....Seattle, Wash.  
 Reilly Repair & Supply Co., James.....New York.  
 Upson-Walton Co. ....Cleveland.

## SHIP LANTERNS AND LAMPS.

Helvig, H. A. J. ....New York.  
 Page Bros. & Co.....New York.  
 Russell & Watson.....Buffalo.

## SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. ....Jersey City, N. J.

## SPARS—LARGE SIZES.

Moran Bros. Co.....Seattle, Wash.

## STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

## STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co.....New York.  
 Holmes, Samuel.....New York.  
 King, Rufus S.....New York.  
 McCarthy, T. R.....Montreal, Can.  
 Newman, R. L.....New York.  
 Weeks, F. H.....New York.

## STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.  
 Erie & Western Trans. Co.....Buffalo.  
 International Nav. Co.....Philadelphia.  
 Pere Marquette R. R. & S. S. Line.....Milwaukee.  
 Red Star Line.....New York.

## STEEL CASTINGS.

Seaboard Steel Casting Co.....Chester, Pa.  
 Macbeth Iron Co.....Cleveland.

## STEERING APPARATUS.

American Ship Building Co.....Cleveland.  
 Chase Machine Co. ....Cleveland.  
 Dake Engine Co.....Grand Haven, Mich.  
 Detroit Shipbuilding Co.....Detroit.  
 Electro-Dynamic Co.....Philadelphia.  
 Hyde Windlass Co.....Bath, Me.  
 Jenks Ship Building Co.....Port Huron, Mich.  
 Queen City Engineering Co.....Buffalo.  
 Sheriff Mfg. Co.....Milwaukee.

## STOCKS, BONDS, SECURITIES.

Brown, W. W.....Cleveland.  
 Fahey & Co.....Cleveland.

## SUBMARINE DIVING APPARATUS

Morse & Son, A. J.....Boston.  
 Schrader's Son, A.....New York.

## SURVEYORS, MARINE.

Goodenough, Walter.....New York.  
 Gaskin, Edward.....Buffalo.  
 Newman, R. L.....New York.  
 See, Horace.....New York.  
 Wood, W. J.....Chicago.

## TESTS OF MATERIAL.

Hunt, Robert W. & Co.....Chicago.  
 Pittsburgh Testing Laboratory, Ltd.....Pittsburg.

## TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

## TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F.....New York.  
 Chicago Pneumatic Tool Co.....Chicago.  
 Railway Appliances Co .....Chicago.  
 Watson-Stillman Co.....New York.

## TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

## TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.  
 Chase Machine Co.....Cleveland.

## TOWING COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.  
 Midland Towing & Wrecking Co., Ltd.....Midland, Ont.

## TRAPS, STEAM.

Haines Co., Wm. S.....Philadelphia.  
 Kieley & Mueller.....New York.

## TRUCKS.

Boston & Lockport Block Co.....Boston.

## TUBING, SEAMLESS.

Benedict & Burnham Mfg. Co.....Waterbury, Conn.  
 National Tube Co.....Pittsburg.  
 Waterbury Brass Co.....New York.

## VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. ....Boston.  
 Ashton Valve Co. ....Boston.  
 Crane Co. ....Chicago.  
 Farnan Brass Works .....Cleveland.  
 Hayden Mfg. Co., N. L.....Columbus, O.  
 Jenkins Bros.....New York.  
 Kieley & Mueller.....New York.  
 Lunkenheimer Co.....Cincinnati.  
 Ross Valve Co. ....Troy, N. Y.

## VALVES FOR WATER AND GAS.

Wood & Co., R. D.....Philadelphia.  
 Ross Valve Co. ....Troy, N. Y.

## VARNISHES.

Berry Brothers, Ltd.....Detroit.  
 New Jersey Zinc Co.....New York.  
 Also Ship Chandlers.

## VESSEL CASTINGS.

American Ship Building Co.....Cleveland.  
 Macbeth Iron Co.....Cleveland.

## VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.  
 Brown & Co.....Buffalo.  
 Brown, W. W.....Cleveland.  
 Dunham, R. J.....Chicago.  
 Elwell, Jas. W. & Co.....New York.  
 Elphicke, C. W. & Co.....Chicago.  
 Hall & Root.....Buffalo.  
 Helm & Co., D. T. ....Duluth.  
 Hawgood & Co., W. A.....Cleveland.  
 Holmes, Samuel.....New York.  
 Hutchinson & Co.....Cleveland.  
 King, Rufus S.....New York.  
 McCarthy, T. R.....Montreal.  
 Newman, R. L.....New York.  
 Mitchell & Co.....Cleveland.  
 Richardson, W. C.....Cleveland.  
 Sullivan, D. & Co.....Chicago.  
 Weeks, F. H.....New York.

## VENTILATING APPARATUS FOR SHIPS.

Buffalo Forge Co. ....Buffalo.  
 Sturtevant, B. F. Co.....Boston.

## WIRE—BRASS AND COPPER.

Waterbury Brass Co.....New York.

## WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.  
 DeGrauw, Aymar & Co. ....New York.  
 Roebbing's Sons John A.....New York and Cleveland.  
 Upson-Walton Co.....Cleveland.

## WHISTLES, STEAM.

American Steam Gauge Co. ....Boston.  
 Ashton Valve Co. ....Boston.  
 Farnan Brass Works .....Cleveland.  
 Lunkenheimer Co.....Cincinnati.

## WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co.....New York.

## WINDLASSES.

American Ship Windlass Co.....Providence, R. I.  
 American Ship Building Co. ....Cleveland.  
 Hyde Windlass Co.....Bath, Me.  
 Jenks Ship Building Co.....Port Huron, Mich.

## WINCHES.

American Ship Windlass Co.....Providence, R. I.  
 Hyde Windlass Co.....Bath, Me.

## WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

## WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co.....Kingston, Ont.  
 Midland Towing & Wrecking Co., Ltd.....Midland, Ont.

## YACHT AND BOAT BUILDERS.

Bell Engineering Works, David .....Buffalo.  
 Drein, Thos. & Son.....Wilmington, Del.  
 Lane & DeGroot.....Long Island City, N. Y.  
 Marine Construction & Dry Dock Co. ....New York.  
 Truscott Boat Mfg. Co. ....St. Joseph, Mich.  
 Warrington Iron Works.....Chicago.  
 Willard, Chas. P. & Co.....Chicago.

## YAWLS.

Drein, Thos. & Son.....Wilmington, Del.  
 Lane & DeGroot.....Long Island City, N. Y.



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No. 28, N Y & Bost Ex ..	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	*10:00am	*10:40am
No. 32, Fast Mail ..... *	*11:25am	*11:30am
No. 44, Ac via Sandusky ..	*12:00pm	.....
No. 46, Southwestern Ex.	.....	*3:00pm
No. 106, Conneaut Accom	.....	*4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent L. m....	*7:40pm	*7:45pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex..... *	*10:30pm	*10:35pm
No. 2, Day Express. .... *	*9:10pm	*9:25pm
No. 126, Norwalk Accom.	*7:50am	.....

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No. 7, Day Express. .... *	.....	*6:10am
No. 15, Bost & Chi Sp....	*3:10am	*3:15am
No. 19, Lake Shore Lim....	*7:15am	*7:20am
No. 23, Western Express.	*10:30am	*10:35am
No. 33, Southern Express	*12:25pm	.....
No. 133, Cleve & Det Ex..	.....	*12:45pm
No. 47, Accommodation....	*11:20am	*1:00pm
No. 141, Sandusky Accom.	.....	*3:10pm
No. 43, Fast Mail ..... *	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	.....	*5:10pm
No. 37, Pacific Express....	*7:00pm	*7:20pm
No. 3, Fast Mail Lim..... *	*10:30pm	*10:55pm
No. 115, Conneaut Accom.	*8:30am	.....

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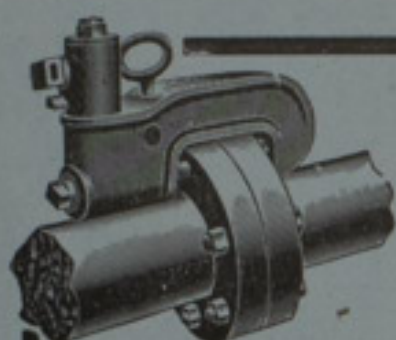
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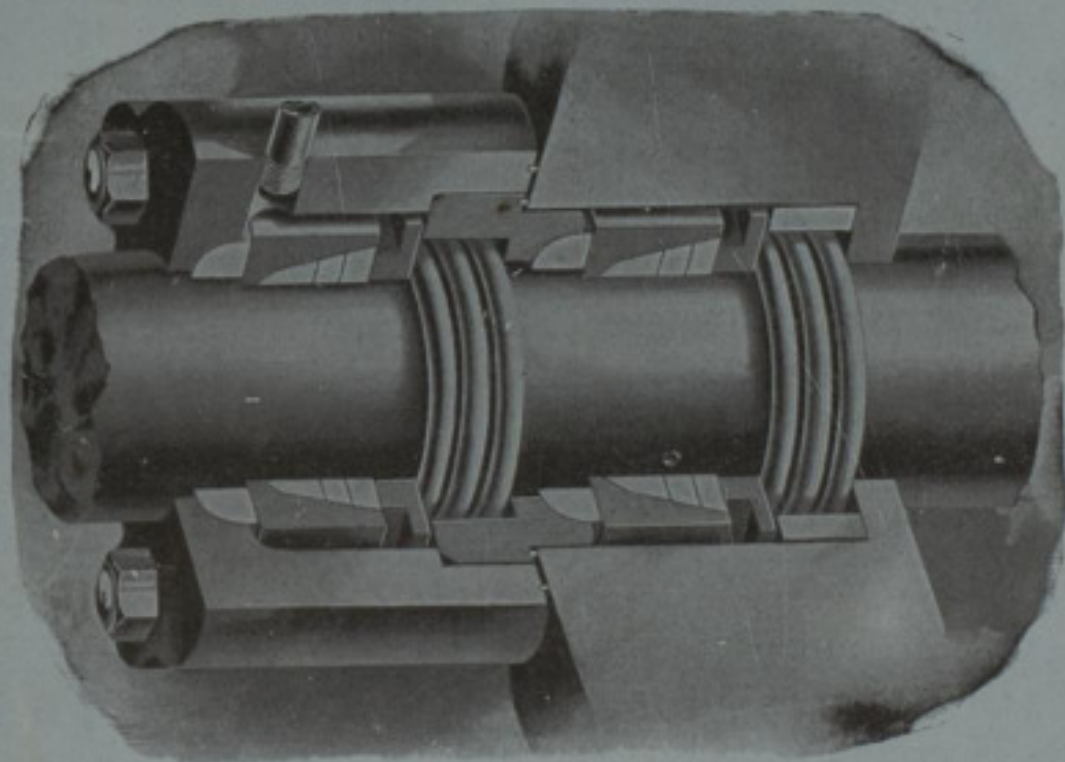
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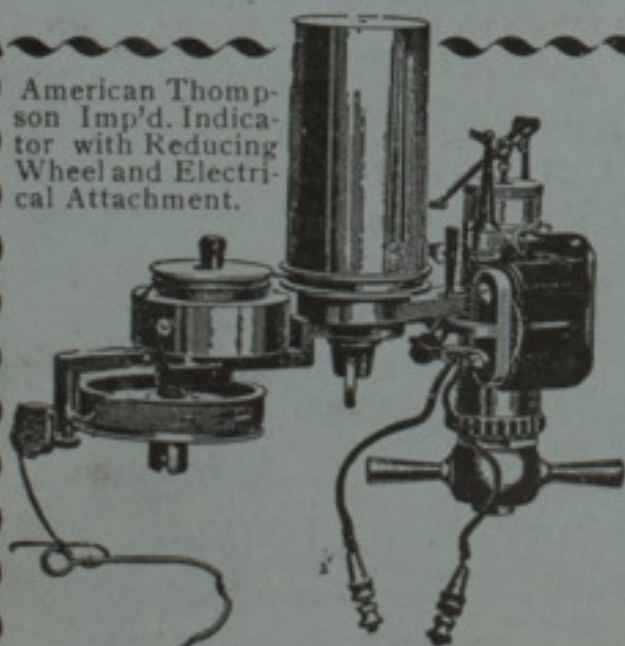
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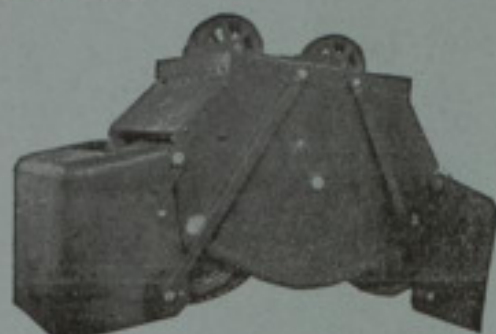
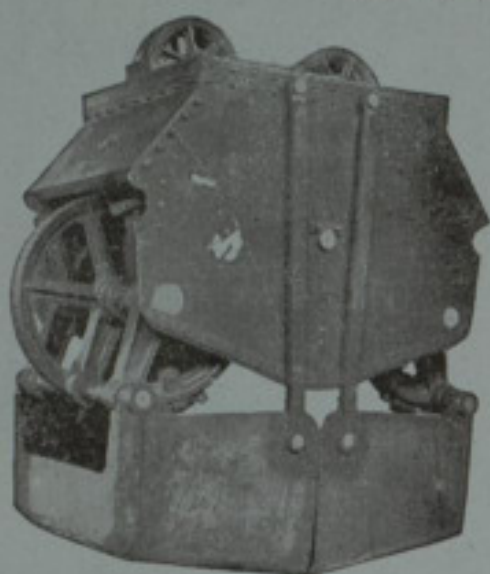
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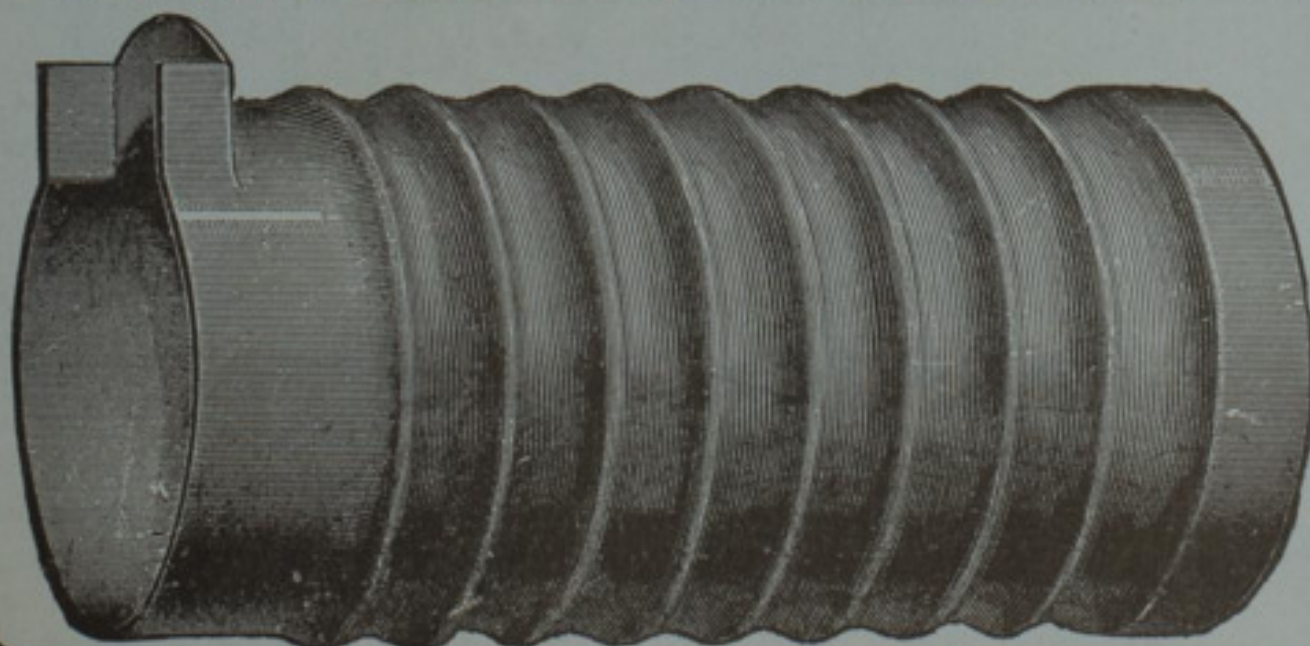
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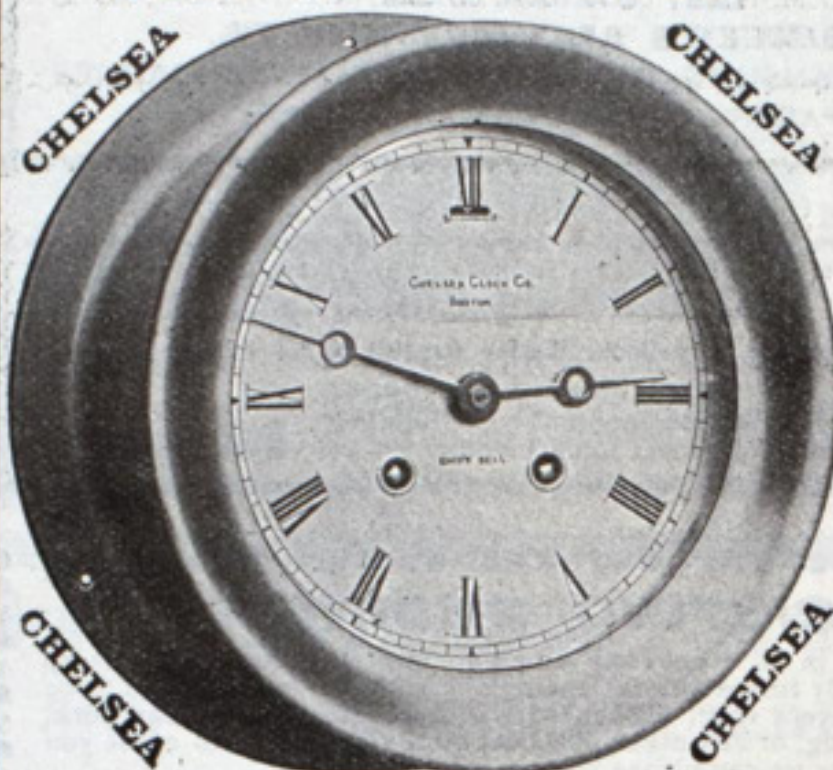
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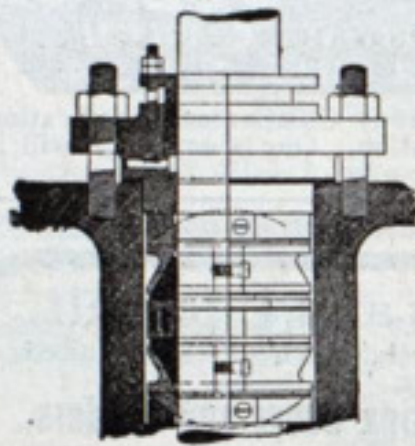
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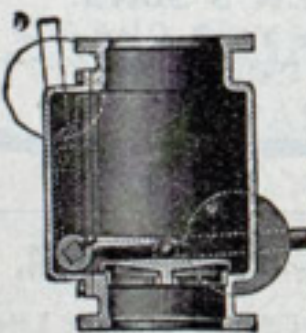
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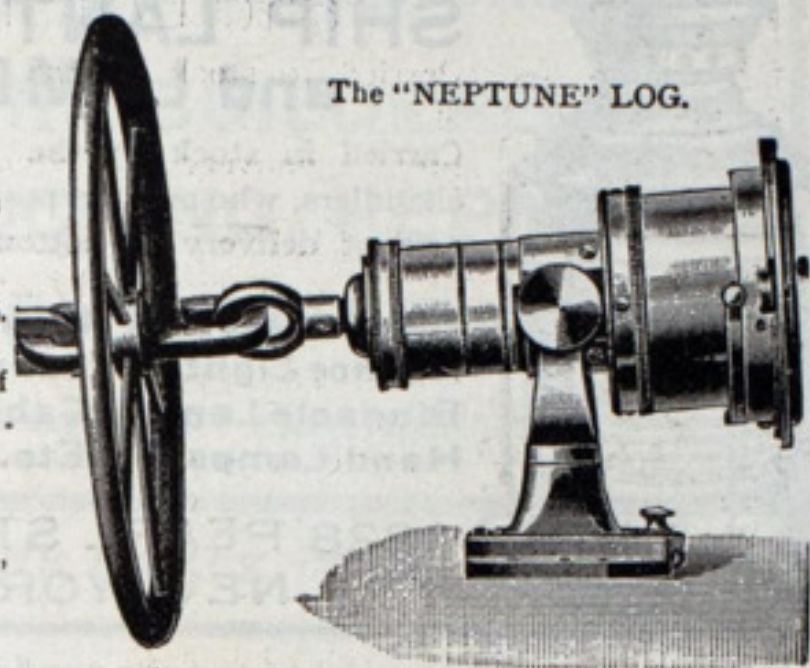
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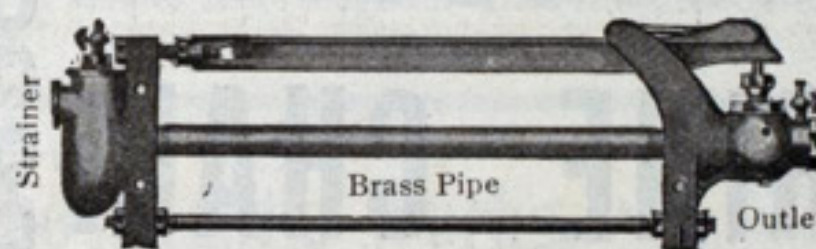
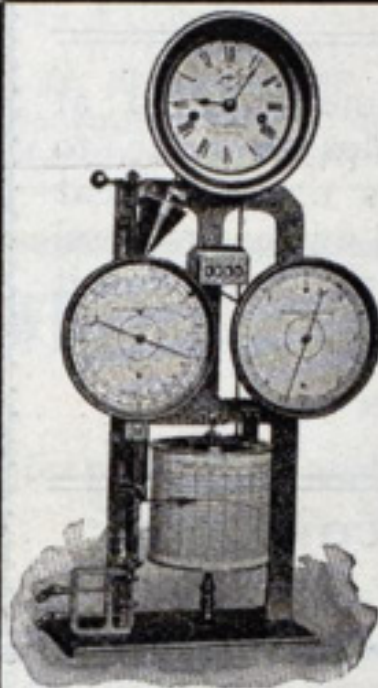
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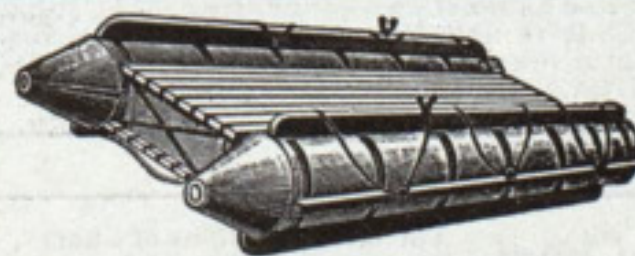


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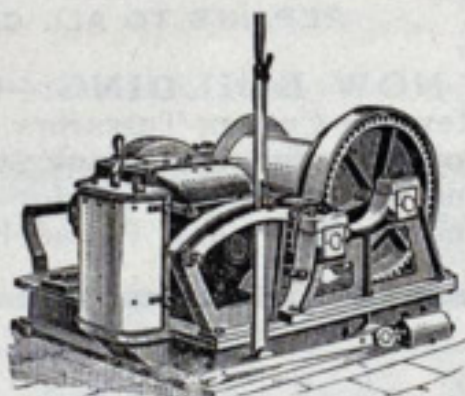
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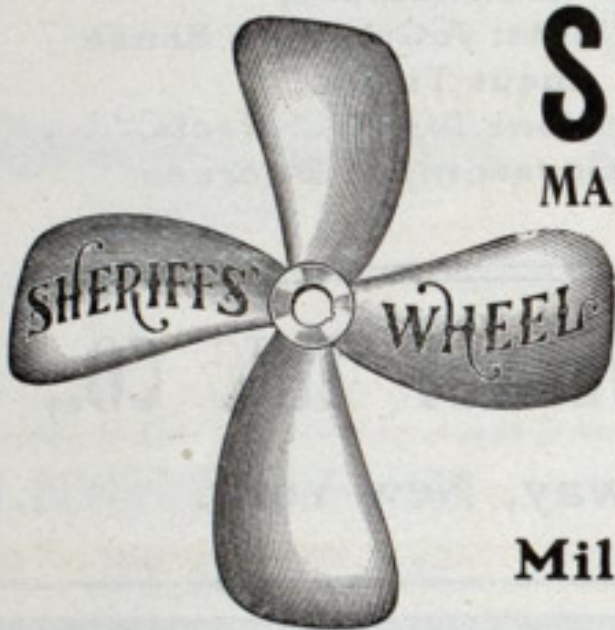
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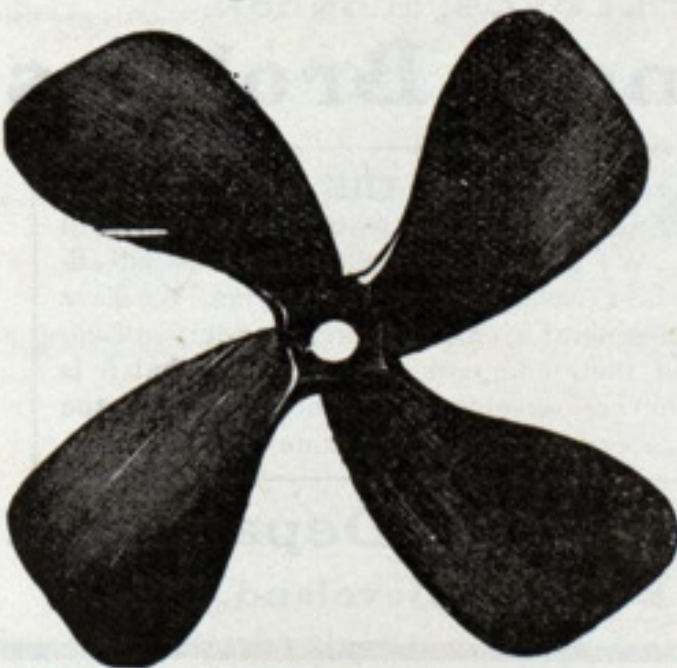
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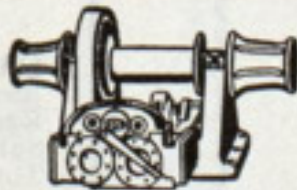


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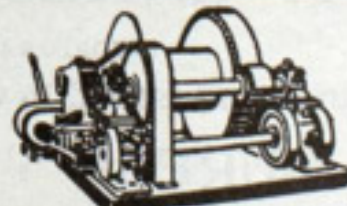
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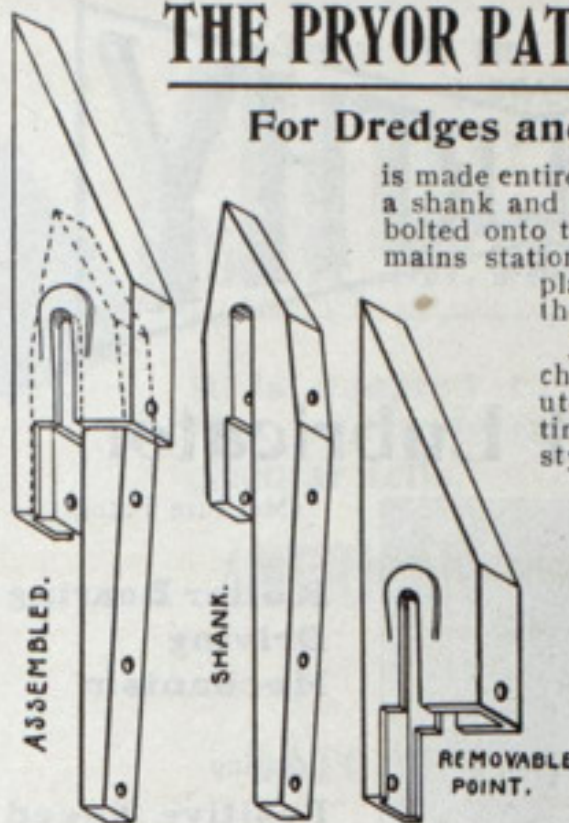
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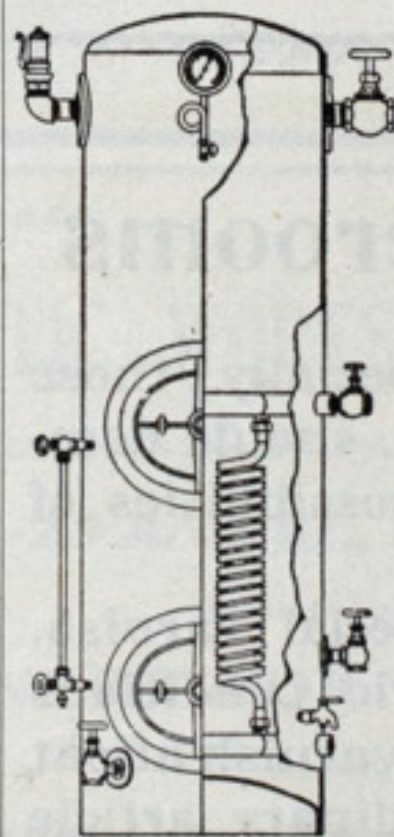
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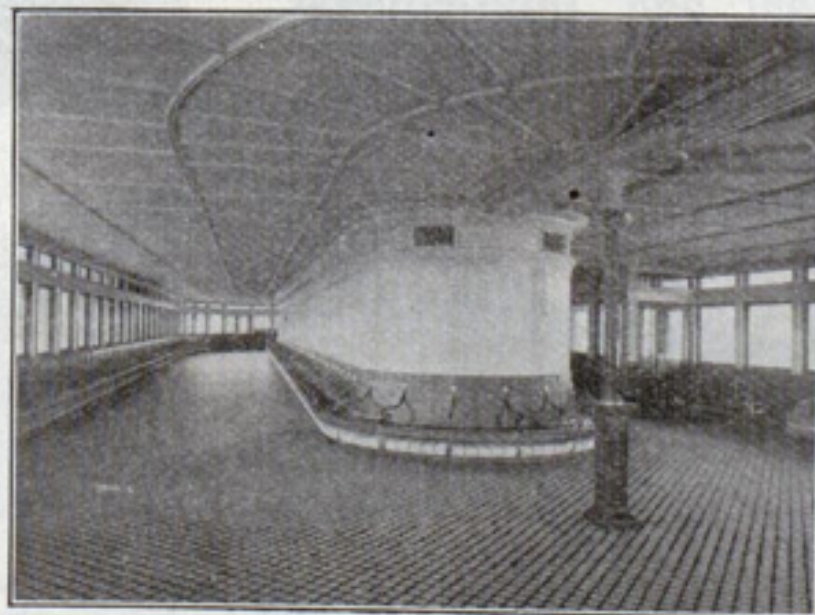
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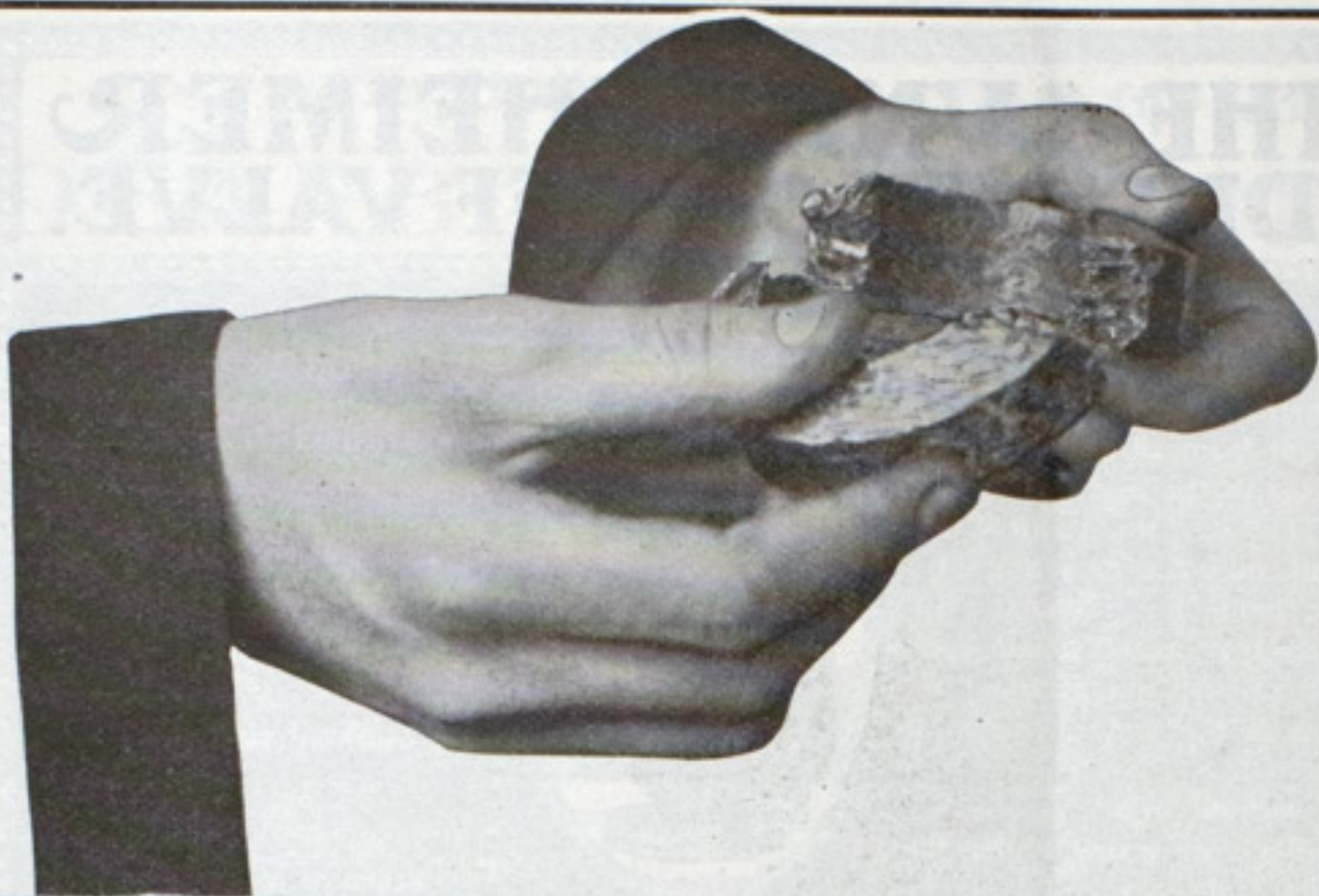
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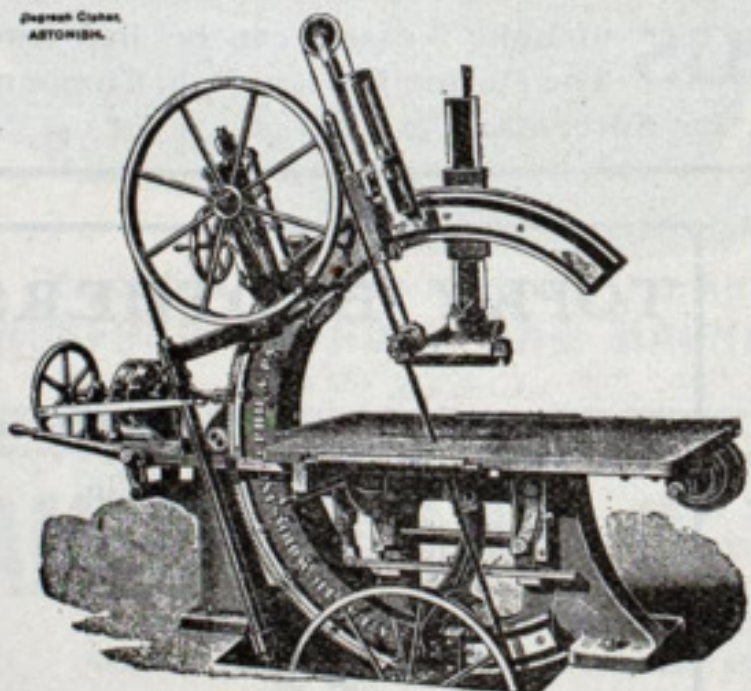
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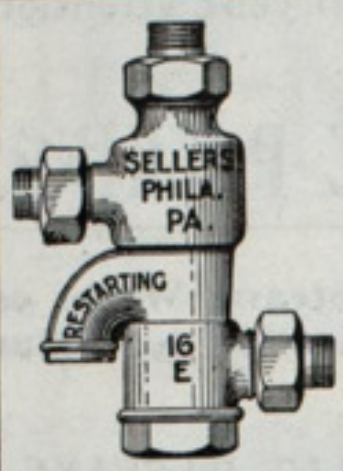
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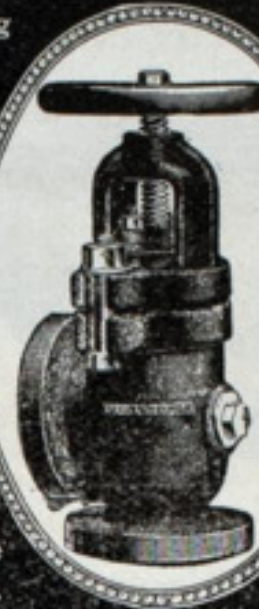
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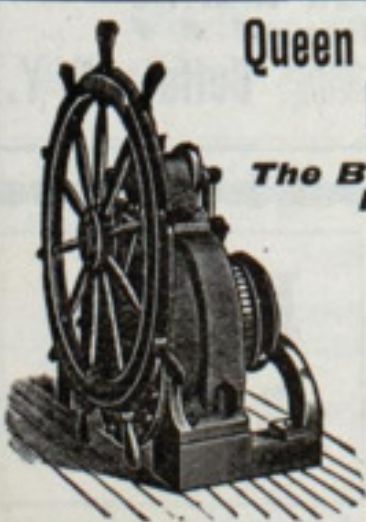
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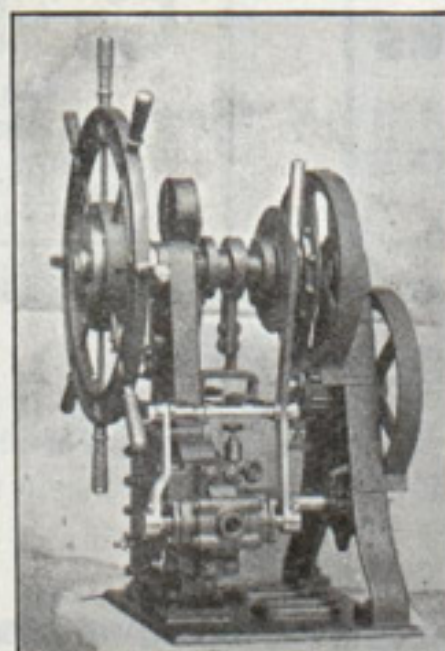
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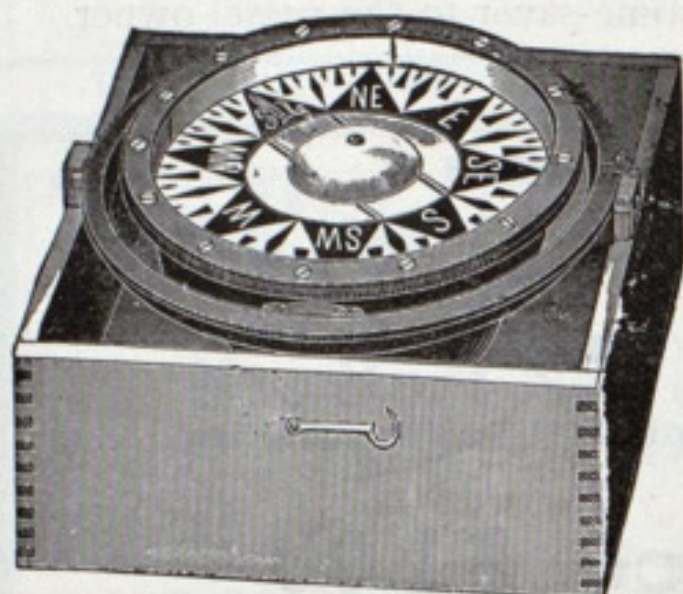
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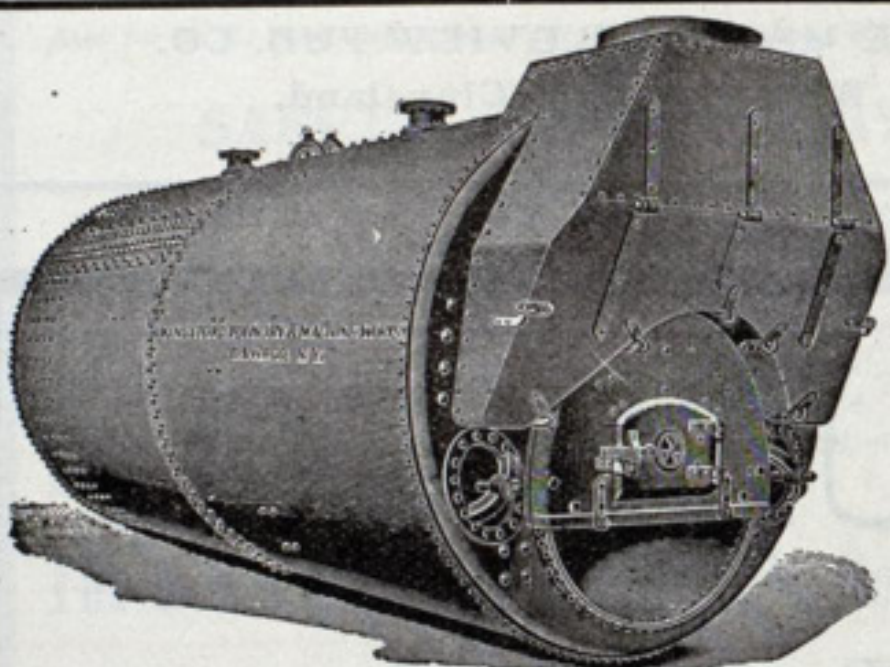


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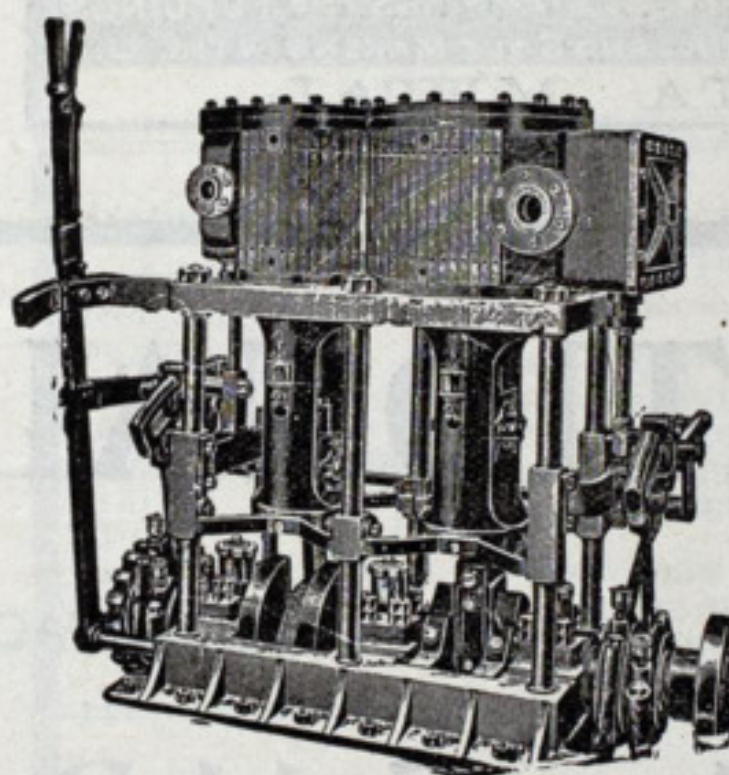
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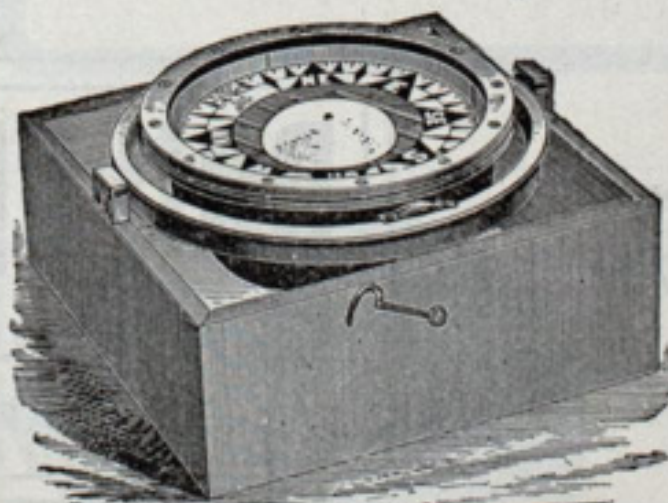
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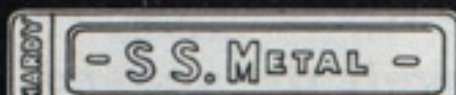
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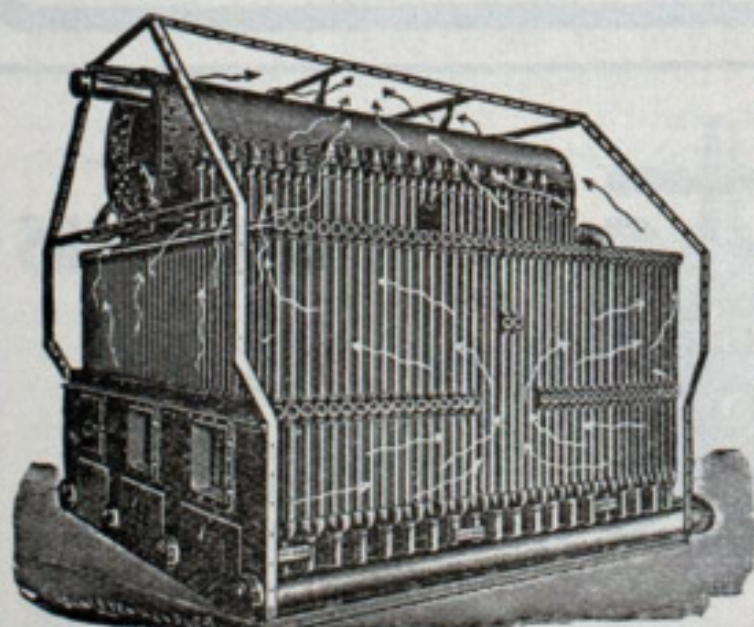
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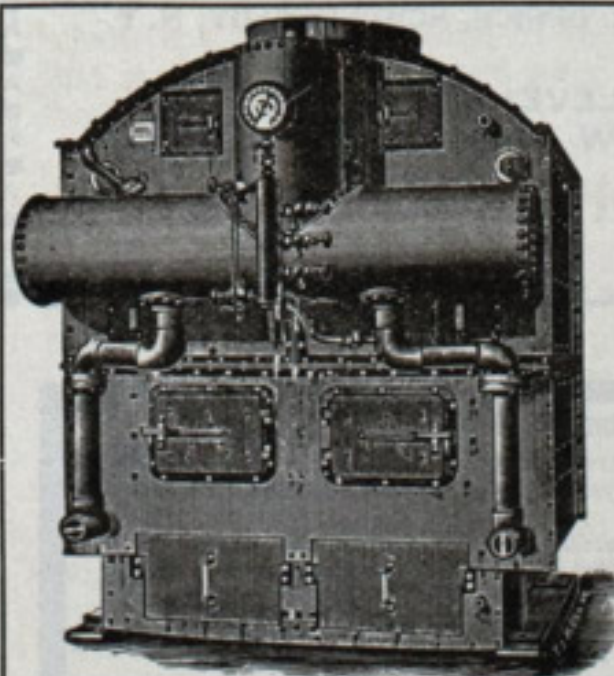
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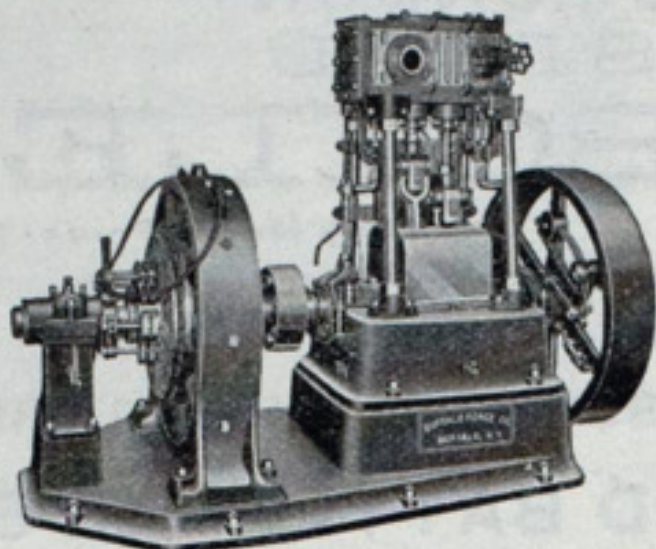


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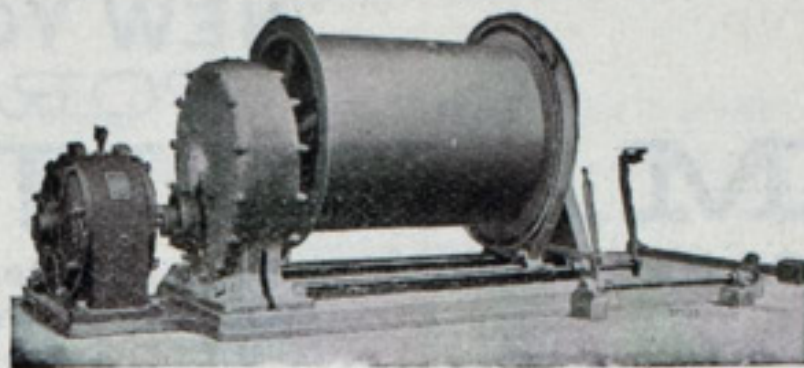
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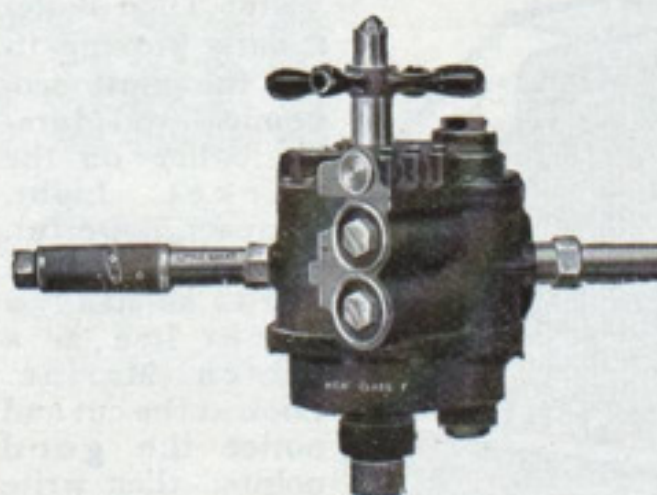
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